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IMPERIAL COUNCIL OF AGRICULTURAL RESEARCH

Proceedings of the Twentieth Meeting of the Advisory Board

Held at New Delhi on the 29th November and 4th and 5th December 1939.

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PROCEEDINGS OF THE MEETING OF THE ADVISORY BOARD OF THE IMPERIAL COUNCIL OF AGRICULTURAL RESEARCH, HELD AT NEW DELHI, ON THE 29TH NOVEMBER, AND 4TH AND 5TH DECEMBER 1939.

The following were present :—

P. M. Kharegat, Esquire, C.I.E., I.C.S., *Chairman.*

1. Mr. R. G. Allan.
2. Mr. B. K. Badami.
3. Dr. W. Burns.
4. Mr. P. H. Carpenter.
5. Lt.-Col. E. Cotter.
6. Sardar Bahadur Sir Datar Singh.
7. Mr. T. J. Egan.
8. Mr. E. S. Farbrother.
9. Mr. M. R. Fotedar.
10. Dr. J. C. Ghosh.
11. Mr. S. Hedayatullah.
12. Mr. T. J. Hurley.
13. Mr. J. H. G. Jerrom.
14. Mr. M. A. Khan.
15. Mr. A. M. Livingstone.
16. Mr. M. I. Malik.
17. Mr. J. C. McDougall.
18. Mr. Mahmud Hasan Khan.
19. Mr. L. Mason.
20. Dr. S. K. Mitra.
21. Mr. S. N. Mozumdar.
22. Mr. K. R. Narayana Iyer.
23. Mr. Nizamuddin Hyder.
24. Mr. B. S. Patel.
25. Dewan Bahadur T. Raghaviah.
26. Mr. P. H. Rama Reddi.
27. Mr. Vishnu Sahay.
28. Mr. M. S. Sarwar.
29. Mr. J. H. Sprott.
30. Mr. H. R. Stewart.
31. Mr. N. S. Subba Rao.

32. Mr. G. T. Tait.
33. Rao Sahib K. I. Thadani.
34. Professor C. N. Vakil.
35. Rao Bahadur B. Viswanath.
36. Captain U. W. F. Walker.
37. Mr. F. Ware.
38. Mr. V. L. Wazir.
39. Sir Mohammad Yakub.
40. Mr. H. Sitarama Reddy.

Mr. S. Basu, *Secretary.*

Visitors.

1. Dr. W. L. Davies.
2. Capt. W. S. Read.
3. Mr. K. Ranganatha Rao.
4. Mr. Indubhusan Chatterjee.
5. Professor P. C. Mahalanobis.
6. Mr. E. J. Bruen.
7. Mr. M. Alam.
8. Mr. Bosi Sen.

In opening the proceedings of the meeting, the Chairman said :—

It gives me great pleasure to welcome and meet you all once again today. We are meeting this time under the shadow of war and it is difficult to foresee at present in what way the war will affect the work of this Council. I need only say that agricultural and veterinary research are as essential in war time as in peace time, though their scope may need some little reorientation. Research designed to develop the agricultural and livestock resources of the country must continue. But new problems will present themselves which will have to be examined. In particular, the present rise in the prices of agricultural produce is bound to be followed by a fall, soon after the war is over ; and it has to be considered from now what action should be taken to prevent the disastrous consequences that might otherwise ensue. Propaganda appears to be necessary to bring this fact home to cultivators and to prevail on them to avoid unnecessary expenditure and unproductive borrowing. Part of the increased income arising from war conditions should be utilised in raising the standards of nutrition of the people ; but part of it should be invested in the form of savings. Perhaps a good method of saving for agriculturists would be to spend some money in making permanent improvements on their holdings, so that when the inevitable slump comes, its effects will to some extent be cushioned by their larger outturn. The construction of wells, the cutting of drainage lines, the application on a larger scale of manure to restore the fertility of the soil, the maintenance of cattle for the production of milk, etc., are some of the directions in which the money might well be invested. But the advice of this Board on a matter like this

would be of great value to the country ; this will have to be supplemented by research to indicate correctly to the cultivators what best they ought to do and attention will have to be paid to the practical application of this research.

2. In this connection I would like to repeat and emphasise what I mentioned at the last meeting, *viz.*, that research cannot be regarded as complete unless and until experiments have been carried out on the fields of cultivators in the villages in order to test the results. It appears to me to be quite erroneous to regard such experiments as " development " and therefore outside the scope of the Research Council. The trying out on the fields of cultivators under normal conditions of the results of research obtained in the laboratory or the farm, is an integral part of the research itself and equally necessary and essential ; it cannot be regarded as the function of another body, government or state. In short, our conception of the scope of research needs to be broadened, and research must include the question of the ascertainment of the best methods of bridging the gap between the attainment of results and their practical application in villages.

3. The question of bridging this gap was talked about at some length at the last meeting and it was suggested that model projects should be put up. It is disappointing to find that not a single such project has yet been received from any provincial government or state. Perhaps this is due to the fact that there are differing ideas as to what constitutes a project of this sort. The basic idea, it seems to me, is to co-ordinate research results in actual practice on a farm or holding. It is not enough to tell a farmer the results of one or two new lines of research or even to get him to try out the same. What is wanted is that the new knowledge available about improved farm practices should be synthetised and integrated and made available to the farmer for practical application ; and he should be induced to adopt the same. It is necessary to view the problem of a farm or a holding as a whole, combine the different lines of scientific information and new knowledge available, giving to each its due weight in practice and introduce all these improvements so as to get an increased outturn from the holding as a whole.

4. If a whole holding is to be efficiently managed so as to continue to secure the maximum profit possible therefrom year after year, it will also be necessary to supply economic information to the farmer, so as to effect a better regulation of supply to demand, the orderly flow of production into consumption. Wise farm management postulates not only an improvement in the technology of the production of particular crops and livestock products, but the practical establishment of a balance between the different crops which the land is capable of producing and the stock that it can carry, with due regard to the needs of the farmer and the market value of the crops and other commodities which he produces. In short, a project aims not only at all round better production in respect of each commodity, but also the utilisation of the available land to the best advantage of the farmer. It is essentially a matter of research to determine as to what is the best method of introducing improvements designed to increase production, and how best to utilise the holding or farm.

5. I have given you my conception of a model project. I do not claim however that this is the only form a project might take. If we have time,

we may discuss the matter further and I am sure an exchange of ideas would be helpful to all. That brings me to another point, to which also I had referred at the last meeting. The main function of this Board undoubtedly is to examine reports, programmes and schemes ; but I cannot accept the idea prevailing in many quarters that this should be its only function. It seems to me to be necessary that in addition this Board and its committees should be a forum for the exchange of views between the representatives of the different provinces and states, where the experience of one may help to solve the problem of another—for many of the problems are common to all. If each province or state could indicate not only how such problems are being tackled but also mention the particular difficulties encountered it would be able to draw upon the common fund of experience of all. For instance, the question of the best method of training the staff, which has to integrate the results of research and put them into practical application on the fields of villagers, so as to fit them for the work they have to do and the difficulties encountered in this connection might profitably be discussed some day by this Board. Similarly the Board might consider the question of co-operative farming and suggest the practical lines to be adopted for making the same successful in our villages, so that research might be carried out to ascertain to what extent it will result in a bigger income for the cultivators. Or again, this Board often makes recommendations which are passed on to provincial governments and states for necessary action ; and then the whole matter is lost sight of ; it would be an advantage if the action taken could occasionally be reviewed by this Board. In short, a review or discussion of such matters, though it may not necessarily result in the formulation of any resolution, is likely to be of mutual benefit to all.

6. On the other hand however I quite realise that such discussions should not be allowed to relegate to the background our main work of examining carefully and critically the working of existing schemes and the programme of new schemes and suggesting suitable action in that connection. In fact I may frankly admit that I am not altogether happy about the way in which this work has to be pushed through in the limited time at our disposal ; and I would like the Advisory Board seriously to consider whether some method cannot be devised of ensuring a more thorough examination of reports, programmes and schemes. In this connection, I would like to suggest that instead of appointing *ad hoc* committees for the different subjects, when we meet, we should have standing committees ; the members would then know beforehand who will have to deal with which scheme and they can come prepared with their criticisms and suggestions about the same.

7. The other suggestion I have to offer is that the Committees should not all meet together as at present. They might meet at different times and the recommendations of all the committees might be considered by the Advisory Board when it meets. The objection to this course is that in some cases it may mean that the same officers would have to come to Delhi several times instead of coming only twice as at present. This however can perhaps be avoided if the Committees are small and consist, apart from the staff at headquarters, only of the technical experts dealing with the particular commodity or subject of a committee, who could bring with them instructions from their Directors where necessary. The Com-

mittee would examine the schemes from the technical standpoint, while the Advisory Board would re-examine the same with the aid of the Directors from both the technical and the administrative viewpoints. Incidentally this would mean that the time spent at a meeting of the Advisory Board will be appreciably reduced.

8. On the present occasion we have apparently only 47 items on our agenda. But many of these really consist of a number of different items and I have worked out that we have to consider, during the course of the next few days no less than 174 different matters. I think you will agree that the sooner we start looking into them, the better. Our programme of work will be as usual that the Board will sit till lunch time, appoint committees and dispose of as many other items as it can and then meet again on Monday and Tuesday and discuss the reports of the different committees and the remaining items on the agenda.

ITEM No. 1.

Decisions of the Governing Body on the recommendation made by the Advisory Board in November 1938 and May 1939. (Appendix I.)

The Chairman said that this subject was only for the information of the Advisory Board. He explained that the Governing Body found themselves in difficulty on account of shortage of funds and they had two alternatives in front of them (1) to sanction a smaller number of schemes for the full period or (2) to sanction a larger number of schemes for short periods in the hope that when finances improved they would be further extended. The Governing Body preferred the second alternative. The question of financing the Council by means of a cess was under the consideration of the Government of India and if that matured and the proposals were accepted by the legislature, it was hoped that the Council's finances would improve and many of the schemes which had been sanctioned for one or two years would be extended.

The decisions of the Governing Body were noted by the Advisory Board.

ITEM No. 2.

Appointment of Committees. (Appendix II.)

The Board approved of the appointment of the following *ad hoc* committees for examining certain items on the agenda in the first instance :—

Benares Hindu University Scheme Committee (Plant Physiology).

1. The Agricultural Commissioner with the Government of India—*Chairman.*
2. Mr. H. R. Stewart, I.A.S., Director of Agriculture, Punjab.
3. Dr. R. D. Rege, Sugarcane Research Station, Padegaon.
4. Dr. A. K. Mitra, Economic Botanist (sugarcane and paddy), United Provinces.
5. Dr. B. N. Singh, Head of the Institute of Agricultural Research, Hindu University, Benares.
6. Mr. Boshi Sen, Vivekananda Laboratory, Almora.
7. Mr. P. H. Carpenter.

Dry Farming Committee.

1. The Vice-Chairman, Imperial Council of Agricultural Research, *Chairman.*
2. The Agricultural Commissioner with the Government of India.

3 to 7. The Directors of Agriculture :—
Madras, Bombay, Punjab, Sind and Hyderabad.

8. The Chief Investigator, Dry Farming Scheme, Bombay.
9. Dr. P. E. Lander, Agricultural Chemist to Government, Punjab.
10. Dr. J. N. Mukerjee. Chemistry Department, Calcutta University.
11. The Agricultural Chemist, Agricultural Research Station, Sakrand (Sind).
12. Mr. Rajdeo (Hyderabad).
13. Dr. Krishna (Hyderabad).

Jowar Committee.

1. The Agricultural Commissioner with the Government of India (*Chairman*).
2. The Director of Agriculture or the Deputy Director of Agriculture. Madras.
3. The Director of Agriculture, Bombay.
4. The Director of Agriculture or the Deputy Director of Agriculture, Hyderabad.
5. The Millet Specialist, Madras.
6. The Cerealist, Punjab.
7. The Economic Botanist, Bombay.
8. The Economic Botanist, Hyderabad.
9. The Economic Botanist, Central Provinces and Berar.
10. A Deputy Director of Agriculture from the United Provinces.
11. The Millets and Oilseeds Botanist, United Provinces.
12. The Director of Agriculture, Sind.
13. The Director of Agriculture, Mysore.
14. The Commissioner of Agriculture, Baroda.
15. The Fodder Specialist to the Government of the Punjab. (Visitor.)

Animal Breeding Committee.

1. The Vice-Chairman, Imperial Council of Agricultural Research—Chairman, *ex-officio.*
2. The Animal Husbandry Commissioner with the Government of India.
3. The Joint Director, Imperial Agricultural Research Institute.
4. The Director, Imperial Veterinary Research Institute.

5. The Livestock Expert, Bombay.
6. The Director of Veterinary Services, Punjab.
7. The Superintendent, Government Cattle Farm, Hissar.
8. The Director of Veterinary Services, United Provinces.
9. The Director of Agriculture, Bihar.
10. The Superintendent, Civil Veterinary Department, Kashmir.
11. The Poultry Research Officer, Imperial Veterinary Research Institute, Izatnagar.
12. Sardar Bahadur Sir Datar Singh.
13. Imperial Dairy Expert, Bangalore.
14. The Director of Dairy Research.
15. Professor James N. Warner, Allahabad Agricultural Institute.
16. The Deputy Director of Agriculture, Cattle Breeding, Bundelkhand Circle, Jhansi.
17. Professor H. K. Mookerjee, Head of the Department of Zoology, Calcutta University.
18. The Agricultural Marketing Adviser to the Government of India.
19. The Superntendent, Civil Veterinary Department, Mysore.
20. Mr. S. M. Sarwar.
21. The Director of Veterinary Services, Bihar.
22. The Assistant Director of Veterinary Services, Orissa.
23. Mr. B. K. Badami, Director of Veterinary Services, Hyderabad.

The Secretary, Imperial Council of Agricultural Research—Secretary, *ex-officio*.

Botanical and Physiological Committee.

1. The Vice-Chairman, Imperial Council of Agricultural Research—*Chairman*.
2. The Agricultural Commissioner with the Government of India.
3. Dr. B. P. Pal, Imperial Economic Botanist, Imperial Agricultural Research Institute.
4. Dr. G. W. Padwick, Imperial Mycologist, Imperial Agricultural Research Institute.

5 to 8. The Directors of Agriculture :—

Punjab, Madras, Sind and United Provinces.

9. Mr. T. S. Sabnis, Economic Botanist (Oilseeds), United Provinces.
10. Khan Sahib Chaudhri Ali Mohammad, Oilseeds Specialist, Lyallpur.
11. Mr. A. B. H. Khoorshid, Economic Botanist, Hyderabad.
12. Professor B. Sahni, The University, Lucknow.
13. Dr. V. K. Badami, Deputy Director of Agriculture, Orissa.

14. Mr. K. Ramiah, Geneticist, Institute of Plant Industry, Indore.
15. Mr. A. M. Thompson, Senior Marketing Officer.
16. Mr. H. C. Javaraya, Senior Marketing Officer.
17. Dr. Hidayetullah, Economic Botanist, Bengal.
18. Mr. J. C. Ramchandani, Botanist, Sind.
19. Professor P. C. Mahalanobis, Statistical Laboratory, Presidency College, Calcutta.
20. Mr. J. H. Sprott, Cooverelly Estate, Mangles Brothers, Coorg.
21. Dr. P. K. Sen, Fruit Physiologist to the Government of Bombay.
22. Dr. B. N. Uppal, Plant Pathologist to the Government of Bombay.
23. Dr. J. F. Dastur, Mycologist, Nagpur.
24. Ch. Ram Dhan Singh, Cerealist, Lyallpur.
25. Rai Bahadur Dr. K. C. Mehta, Agra College, Agra.
26. Dr. H. K. Nandi, Economic Botanist, Jorhat, Assam.
27. Dr. B. N. Singh.
28. Mr. Bosi Sen.
29. Mr. S. C. Sen, Superintendent, Cinchona Cultivation in Bengal, Mungpoo.
30. Dr. B. L. Sethi.
31. Mr. M. Alam.
32. Dr. Krishna (Forest Research Institute).
33. Professor L. S. S. Kumar.

Secretary, Imperial Council of Agricultural Research, Secretary, *ex-officio*.

Fruit Committee.

1. The Vice-Chairman, Imperial Council of Agricultural Research—*Chairman*.
2. The Agricultural Commissioner with the Government of India.
3. Rao Bahadur B. Viswanath.

4—11 The Directors of Agriculture :—

Madras, Bombay, Bengal, United Provinces, Punjab, Bihar, Central Provinces and Kashmir.

12. The Commissioner of Agriculture, Baroda.
13. Mr. H. C. Javaraya, Senior Marketing Officer (Fruit).
14. The Agricultural Officer, North-West Frontier Province.
15. The Agricultural Officer, Baluchistan.
16. Mr. G. T. Tait.
17. The Imperial Entomologist.
18. The Imperial Mycologist.

19. Sardar Sahib Lal Singh, Fruit Specialist, Punjab.
20. Dr. G. S. Cheema, Horticulturist to Government, Bombay.
21. Dr. P. K. Sen.
22. Rao Sahib K. I. Thadani, Director of Agriculture, Sind.
23. Dr. Hidayetullah, Economic Botanist, Bengal.
24. Diwan Bahadur T. Raghaviah.
25. Mr. P. H. Carpeuter.
26. Mr. J. H. Sprott (Coorg).
27. Dr. J. F. Dastur, Mycologist (Central Provinces), Nagpur.
28. Dr. B. N. Uppal, Plant Pathologist to Government, Bombay.
29. Professor S. P. Agharkar, Botany Department, Calcutta University.
30. Mr. Zarbakht Khan, Horticulturist, North-West Frontier Province, Peshawar.
31. Dr. Birbal Sahni, F.R.S.
32. Dr. S. K. Mitra.

Secretary, Imperial Council of Agricultural Research, Secretary, *ex-officio*.

Entomological and Pathological Committee.

1. The Vice-Chairman, Imperial Council of Agricultural Research, *Chairman*.
2. The Agricultural Commissioner with the Government of India.
3. The Director, Imperial Agricultural Research Institute.
4. Lieut.-Colonel E. Cotter, I.M.S., Public Health Commissioner with the Government of India.
5. The Director of Agriculture, United Provinces.
6. The Entomologist to Government, Punjab.
7. Mr. A. M. Mustafa, Agricultural Officer, Baluchistan.
8. The Imperial Entomologist, Imperial Agricultural Research Institute.
9. The Imperial Mycologist, Imperial Agricultural Research Institute.
10. The Director of Agriculture, Kashmir.
11. Sardar Sahib Lal Singh, Fruit Specialist, Lyallpur.
12. Mr. K. R. Narayana Iyer, Director of Agriculture, Travancore.
13. Dr. Hidayetullah, Economic Botanist, Bengal.
14. Dr. A. K. Mitra, Economic Botanist, United Provinces.
15. Khan Bahadur M. Afzal Husain.
16. Professor P. C. Mahalanobis.
17. Dr. J. C. H. Templer, Entomologist.

18. Dr. J. F. Dastur, Mycologist, Nagpur.
19. Dr. B. N. Uppal, Plant Pathologist to Government, Bombay.
20. Mr. P. V. Isaac, Second Imperial Entomologist, Imperial Agricultural Research Institute.
21. Dr. J. A. Muliyil, Biological Control Officer, Imperial Agricultural Research Institute.

Secretary, Imperial Council of Agricultural Research, Secretary, *ex-officio*.

Animal Pests and Diseases Committee.

1. The Vice-Chairman, Imperial Council of Agricultural Research, Chairman, *ex-officio*.
2. The Animal Husbandry Commissioner with the Government of India.
3. The Director, Imperial Veterinary Research Institute, Mukteswar.
4. The Director of Veterinary Services, Madras.
5. The Director of Veterinary Services, Bombay.
6. The Director, Civil Veterinary Department and Veterinary Adviser to the Government of Bengal, Calcutta.
7. The Director of Veterinary Services, United Provinces.
8. The Director of Veterinary Services, Punjab.
9. The Director of Veterinary Services, Bihar.
10. The Deputy Director of Veterinary Services, Central Provinces and Berar.
11. The Director, Civil Veterinary Department, Assam.
12. The Superintendent, Civil Veterinary Department, North-West Frontier Province.
13. The Director of Veterinary Services, Sind.
14. The Deputy Director of Veterinary Science and Animal Husbandry, Baroda.
15. The Senior Veterinary Inspector, Cochin.
16. The Superintendent, Civil Veterinary Department, Kashmir.
17. The Director of Veterinary Services in India, Army Headquarters, Simla.
18. The Superintendent, Civil Veterinary Department, Mysore.
19. The Director, Civil Veterinary Department, Hyderabad.
20. Mr. S. K. Sen, Entomologist, Imperial Veterinary Research Institute, Mukteswar.
21. Sir C. V. Mehta.
22. Assistant Director of Veterinary Services, Orissa.

Secretary, Imperial Council of Agricultural Research. Secretary, *ex-officio*.

Cardamoms Committee.

1. The Agricultural Commissioner with the Government of India (*Chairman*).

2—4. The Directors of Agriculture, Madras, Mysore and Travancore.

5. Mr. J. H. Sprott.

6. The Director, Imperial Agricultural Research Institute, New Delhi.

7. Dr. B. N. Uppal, Plant Pathologist to the Government of Bombay.

8. The Imperial Entomologist, Imperial Agricultural Research Institute.

9. Mr. P. H. Carpenter, Director, Scientific Department, Indian Tea Association, Tocklai.

10. Diwan Bahadur T. Raghaviah.

11. Mr. H. C. Javaraya.

The Board referred certain other items for consideration in the first instance by the following Standing Committees :—

Animal Nutrition Committee.

1. The Vice-Chairman, Imperial Council of Agricultural Research—Chairman, *ex-officio*.
2. The Animal Husbandry Commissioner with the Government of India.
3. Dr. P. E. Lander, Agricultural Chemist, Punjab, Lyallpur.
4. Dr. K. C. Sen, Officer-in-Charge, Animal Nutrition Section, Izatnagar.
5. Rao Bahadur B. Viswanath, Director, Imperial Agricultural Research Institute, New Delhi.
6. Mr. J. R. Haddow, Imperial Veterinary Research Institute, Mukteswar.
7. Mr. Zal R. Kothavalla, Imperial Dairy Expert, Bangalore.
8. The Director, Imperial Veterinary Research Institute, Mukteswar.
9. The Director of Veterinary Services, Army Headquarters, Simla.
10. The Director, Nutrition Research, Indian Research Fund Association, Coonoor.
11. The Director of Veterinary Services, Punjab, Lahore.
12. Babu Gostha Bihari Pal, Agricultural Chemist, Bengal.
13. Khan Sahib Syed Ghulam Husain, Animal Husbandry Officer, Bhopal.
14. The Director, Civil Veterinary Department and Veterinary Adviser to the Government of Bengal, Calcutta.
15. The Director of Veterinary Services, Bombay.
16. Dr. Burch H. Schneider, Allahabad Agricultural Institute, Allahabad.

17. The Director of Veterinary Services, United Provinces, Lucknow.
18. The Deputy Director of Agriculture, Bundelkhand Circle, Jhansi, United Provinces
19. Mr. P. V. Ramiah, Agricultural Chemist, Coimbatore.
20. Rao Sahib D. V. Bal, Agricultural Chemist, Central Provinces and Berar.
21. Major C. E. McGuckin, Assistant Director of Military Dairy Farms, Northern Circle, Lahore Cantonment.
22. Dr. W. L. Davies, Director of Dairy Research.

Secretary, Imperial Council of Agricultural Research—Secretary, *ex-officio.*

Fodder and Grazing Committee.

1. The Vice-Chairman, Imperial Council of Agricultural Research, Chairman, *ex-officio.*
2. The Agricultural Commissioner with the Government of India.
3. The Animal Husbandry Commissioner with the Government of India.
4. The Parliamentary Secretary to the Hon'ble the Minister for Agriculture and Rural Development, Madras.
5. The Director of Remounts, Army Headquarters (or a representative).
6. The Director of Farms, Army Headquarters (or a representative).
7. Inspector General of Forests, Forest Research Institute, Dehra Dun.

*8. The Director of Dairy Research, India.

9. Dr. K. C. Sen, Officer-in-Charge, Animal Nutrition Section, Izatnagar.
10. Mr. C. C. Wilson, Chief Conservator of Forests, Madras.
11. Mr. E. J. Bruen, Livestock Expert to the Government of Bombay.
12. Professor L. S. S. Kumar, College of Agriculture, Poona.

*13. The Senior Conservator of Forests, Bengal. (*Vice* Mr. P. J. Kerr.)

14. Mr. L. A. Smythies, Chief Conservator of Forests, United Provinces.

*15. The Director of Agriculture, United Provinces. (*Vice* Conservator of Forests, United Provinces.)

16. Dr. R. Maclagen Gorrie, District Forest Officer, Siwaliks Division, Punjab.
17. Mr. W. S. Read, Superintendent, Government Cattle Farm, Hissar.

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*Indicates visitors.

*18. The Director of Agriculture, Bihar.

*19. The Conservator of Forest, Bihar.

*20. Lt.-Col. C. A. Maclean, Deputy Director of Agriculture, Bihar.

21. Mr. E. A. H. Churchill, Deputy Director of Agriculture, Central Provinces and Berar.

*22. The Agricultural Officer, North-West Frontier Province.

*23. The Director of Agriculture, Sind or the Conservator of Forests, Sind.

*24. The Deputy Director of Agriculture, Orissa.

*25. Mr. Fuzlul Haq, Deputy Director of Agriculture, Assam.

*26. The Commissioner of Agriculture, Baroda.

*27. The Director of Agriculture, Bhopal.

*28. Sardar Bahadur Sir Datar Singh.

29. Mr. S. H. Howard, Conservator of Forests (United Provinces).

*30. Dr. N. D. Kehr.

31. Mr. P. J. Kerr.

*32. The Revenue Secretary, Bhopal Government.

Co-opted members :—

1. Mr. J. H. Sprott.
2. Dr. S. K. Mitra.
3. Mr. K. R. Narayana Iyer.
4. Mr. S. M. Sarwar.
5. Rao Sahib D. R. Moharikar.
6. Mr. P. H. Rama Reddi.

Soil Science Committee.

1. The Vice-Chairman, Imperial Council of Agricultural Research, Chairman—*ex-officio*.
2. The Agricultural Commissioner with the Government of India.
3. The Agricultural Chemist, United Provinces.
4. The Agricultural Chemist, Punjab.
5. The Agricultural Chemist, Bihar.
6. The Agricultural Chemist, Central Provinces.
7. The Agricultural Chemist, Sind.
8. The Deputy Director of Agriculture, Orissa.
9. Lieutenant-Colonel C. A. MacLean, I. A. S., Deputy Director of Agriculture, Bihar.
10. Rao Bahadur B. Viswanath, F.I.C., Officiating Director, Imperial Agricultural Research Institute, New Delhi (Soil Chemist).

*Indicates visitors.

11. Dr. J. K. Basu, Soil Physicist, Sugarcane Research Scheme, Bombay-Deccan (Soil Physicist).
12. Dr. P. G. Krishna, Agricultural Chemist to the Government of Hyderabad (Soil Physicist).
13. Dr. E. MacKenzie Taylor, M.B.E., Director, Irrigation Research, Punjab (Soil Physicist).
14. Dr. J. C. Ghosh, D.Sc., Director, Indian Institute of Science, Bangalore (Physical Chemist).
15. Dr. J. N. Mukherjee, D.Sc., Kaira Professor of Chemistry, Calcutta University.
16. Mr. P. H. Carpenter, Chief Scientific Officer, Indian Tea Association, Assam.
17. Dr. Nazir Ahmad, Director, Technological Laboratory, Indian Central Cotton Committee, Bombay.
18. Dr. J. K. Dubey, Director of Agriculture and State Chemist, Government of Bhopal.
19. Mr. R. G. Allan, Commissioner of Agriculture, Baroda.
20. Dr. Sri Krishna, Bio-Chemist, Forest Research Institute and College, Dehra Dun.

Secretary, Imperial Council of Agricultural Research—Secretary, *ex-officio*.

ITEM No. 3.

Security of tenure for the research staff of the Imperial Council of Agricultural Research. (Appendix III.)

Dr. Burns in introducing the proposal said that Sir John Russell had recommended that officers who showed an aptitude for research or extension work, should be kept at their work and should not be compelled to seek promotion outside the sphere in which they had proved their capacity for success. Although the Council's schemes were by their nature temporary, the research staff should after a probationary period be given certain advantages of permanence ; in particular a provident fund scheme should be set up for them, a Register of competent workers should be maintained so as to help the men to find other posts, and a permanent cadre of selected workers of proved merit should be formed for the purposes of carrying out investigations wherever this might be necessary. He informed the Board of the correspondence he had on the subject with the United States Department of Agriculture and other persons and institutions, and pointed out briefly the implifications of this scheme.

The Chairman said that combined with the question of the security of tenure was the question of allowing Provident Fund benefits the cost of which would approximately come to Rs. 40,000 per annum under present conditions. If, however, quinquennial increments are substituted for the present annual increments, the cost will be reduced to Rs. 36,000 of which Rs. 32,000 would be met from savings affected by the stoppage of annual increments, so that the net cost to the Council would approximately come to Rs. 4,000 only per annum.

Mr. Stewart pointed out that the quinquennial system of increments would not work at all in the Punjab. Men for the Council's schemes were recruited from the same class of candidates as those for the permanent staff. It would be well nigh impossible to get men to accept quinquennial increments, when their colleagues could get an annual increment for doing the same type of work in the permanent cadre of the Department.

Dr. Ghosh pointed out that the position, of the Bengal research worker was extremely unsatisfactory in that under the Bengal Government rules, the Accountant-General, Bengal, would not permit increments in pay of temporary staff. In the past several years increments were allowed by the Council but the amount had to be refunded. There was an urgent need of making some arrangements by which the worker could get the benefit of the Provident Fund or pension.

Dr. Hidayatullah pointed out that the pay of temporary staff in Bengal was also subject to a cut of 15 per cent. Research Assistants under him had been working for the last eight years without any increment, as no such increment could be allowed under the Bengal rules.

Mr. Stewart said that when they got a grant from the Council, provision for annual expenditure was made in their provincial budget and the staff for schemes was recruited on a temporary basis in the ordinary way for the subordinate or provincial service. This arrangement was in all respects similar to the recruitment of permanent men on the same scale of pay. He could not get suitable men, at any rate, in the Punjab to accept quinquennial increments.

Mr. Rama Reddi did not favour any discrimination between the men recruited for the Council's schemes and those recruited for the Madras Agricultural Department, unless the Council were prepared to control these men direct.

Mr. Thadani said that more than half the staff of the Agricultural Department was employed on a temporary basis, so the employees of the Council's schemes would not be at a disadvantage compared to those already employed in the Department.

Mr. Viswa Nath said that the difficulty would be mitigated if temporary men could be absorbed in the Department when vacancies occurred.

Mr. McDougall said that they were considering on merits the cases of some of the research assistants for absorption in the Central Provinces Department of Agriculture whose terms of employment in the Council's schemes had expired.

Dr. Hidayatullah said that appointments in Bengal were made on a communal basis and the system of absorption in the Department of temporary men would not be feasible.

Dr. Ghosh said that the Council should not only be the *de-jure* employer but also *de-facto* employer. He cited the instance of the Indian Research Fund Association as an organisation, the interests of whose employees were looked after better. The appointment of men and the termination of their services rested with the Secretary of the Association who, as oppotunity occurred, transferred workers from one scheme to the other. The Council should also in a similar manner take special interest in the question of security of tenure of their employees. He

suggested that every scheme should terminate on the 31st of March and new schemes should come into operation on the 1st April.

Mr. I. Chatterji (a visitor,) said that the men employed under the Council's schemes in Bengal were like other Government Servants, subject not only to 15 per cent. cut but being temporary were also debarred from increments. The increment might be made triennial as the proposed quinquennial increment would involve great hardship.

Dr. S. K. Mitra agreed with Dr. Ghosh. In reply to the Chairman's enquiry whether the staff all over India should be placed on a standard scale of pay, whatever the scale of pay in the provinces might be, Dr. Mitra said that he would not object to it. It is now important that the staff should have security of tenure.

Mr. Thadani said he did not think Provincial Governments would find it easy to accept the principle of a standard scale of pay for all India. The proposal of Dr. Ghosh was sound but there was administrative difficulty in giving effect to it, as the men employed on Council's schemes in the Provinces were *de-jure* servants of the Provincial Governments.

Sardar Bahadur Sir Datar Singh enquired how the arrangement would work in view of the fact that the provinces generally contributed 50 per cent. of the cost of the scheme. They would not agree to take a man on a higher salary, if one on a lower salary could be obtained.

Dr. Ghosh said that there were different cadres under the Indian Research Fund Association and particular men were chosen for particular cadres. He suggested the Council should have similar cadres. If a scheme required a man of 3rd division, a person so qualified could be put in that scheme. In any case the difficulty could be met if the Council gave one of its Officers for a scheme, plus a share of the balance of the cost and such a stipulation was entered into with the provinces, when the scheme was sanctioned.

Dr. Burns suggested that the Council should consider the creation of a body of highly trained men who would prove themselves worthy of permanent retention.

Mr. Carpenter said that if the constitution of the Council permitted the employment of a permanent staff, it would have been an ideal solution.

In regard to the proposal for transfer of staff from one scheme to another, there was one particular difficulty and he would like to know how it could be overcome, *viz.*, when a man had finished one job in which he was considered very capable, how could he be transferred to another job of an entirely different nature where the chances were that he might not prove equally capable. In such cases a new man might be more capable. There was therefore some danger in acting in accordance with this proposal.

Mr. Ware said that the Board had some time ago put forward a recommendation that the Disease Investigation Officers might be taken on to the permanent cadre of the Mukteswar Institute. He had not heard anything further about that proposal but his own personal feeling was that there was little chance of its being accepted by the Government of India. He agreed with the proposal of Dr. Burns relating to

the retention of suitable qualified men as there were quite a number of very hard-working useful officers who had proved their worth.

The Chairman in summing up the discussion said that it was generally agreed that if finances permitted, Provident Fund benefit should be given to all the employees of the Imperial Council of Agricultural Research. The second point was about the increments. One suggestion was that the Council should give quinquennial increments and thus take away what was given in the shape of Provident Fund benefit, and the other was that there should be a standard scale of pay for the whole of India and the Provincial Governments should be asked to accept that scale of pay in respect of the Imperial Council of Agricultural Research employees. That, however, seemed to raise a much bigger question which could not be decided without consulting the Provincial Governments as to what their difficulties would be in giving effect to such a proposal. He, therefore, suggested that the Council should, first ascertain the views of the Provincial Governments on the question of increment and exactly what their present practices were, which, it seemed, were different in different Provinces. As regards the possibility of making the staff permanent, it had been pointed out already, that constitutionally the Council could not employ permanent servants but a start could be made by maintaining a register of all suitable persons thrown out of employment by the termination of particular schemes and their names could be considered when a new scheme was sanctioned. If any of them was suitable, he should be recommended for employment under another scheme. Finally he added that the Council should also explore the possibility of attaching such employees to the Research Institutes, Mukteswar, Izatnagar and New Delhi in consultation with the Directors of those Institutes.

The Board agreed to these suggestions.

ITEM No. 4.

Request from the Inter-University Board, India for supply of a list of subjects suitable for research at the Universities. (Appendix IV.)

Mr. Subba Rao explained the purpose of the resolution, passed at the last meeting of the Inter-University Board and said that though the necessity for such co-operation had been accepted in principle, it had not been given effect to in practice to the desired extent.

Khan Bahadur Afzal Husain thought that this might involve the question of granting money for research work at the Universities or provision of schalarships. In many Universities M. Sc. was now a 'research' degree and Ph. D. degree had also been instituted. It would, therefore, be considerably helpful if the Council could prepare and circulate to the Universities a list of subjects on applied research on the lines adopted by the Ministry of Agriculture and Fisheries in the United Kingdom. The Universities would then be in a position to devote attention to practical problems, instead of confining their activities to academic research only.

Mr. Ware speaking on behalf of the veterinary scientists in this country said that the resolution passed at the last meeting of the Inter-University Board contained no mention of veterinary research. He said that they had found difficulties in providing facilities for higher research in veterinary subjects. The Imperial Veterinary Research Institute had

two schalarships tenable for a period of two years. One of the scholarships was given some time ago to a candidate with an M.Sc., degree in Zoology from the Bombay University. He wanted to have a Ph.D. degree in Helminthology. He began work at the Mukteswar Institute and then applied to the Bombay University for recognition of the Mukteswar Institute as a place where this degree could be obtained. After a great deal of correspondence and time he was able to get this recognition.

Mr. Ware observed that in any resolution of this nature which may be passed by the Inter-University Board or by this Council the interests of veterinary research should receive the same attention as was given to agricultural research and the Imperial Veterinary Research Institute recognised by all the Universities in India as a suitable centre for carrying on higher researches on veterinary subjects.

Rao Bahadur Viswanath said that this subject on which a note by him was among the papers of the agenda of the Board owed its origin to a request received from the Educational Commissioner for the submission of a note to the meeting of the Inter-University Conference in Bombay. His feeling was that the Imperial Council of Agricultural Research had been very successful in establishing a very desirable liaison between the experimental station, the Agricultural Research Institute and the Universities but he felt that it would be a good plan if a machinery were set up by which the workers at the Agricultural Research Institute and Research Stations could have opportunities of being associated with the work of the Universities. Similarly the Universities could also send some of their men, who have been working on specific problems, to the Research Institute so that they might know at first hand the scope and the limitations of the work which they had undertaken and its practical application to agriculture. He was strongly of the opinion that the Provincial and the Central Governments and the Agricultural Institute should devise a machinery by which members of their departments could be deputed for short periods to work in the University laboratories and *vice-versa*.

Professor Vakil said that the Economics Departments of the Universities should also be in close touch with the agricultural research work, and that action should be taken to utilise the resources of the Economics Departments of the Universities which could be very helpful in carrying out surveys of the nature undertaken at present by the Agricultural Marketing Staff.

Rao Sahib Thadani suggested that a list of all the well-equipped agricultural and veterinary institutes and stations should be maintained and supplied to the Universities.

The Chairman suggested that the Imperial Council of Agricultural Research should suggest to the Universities the lines along which collaboration with them in agricultural and veterinary research could be effected. It should be understood, however that this was not to be regarded as an invitation by the Council to send up applications for grants in aid in respect of all such matters and that the Council could not count itself to any scheme ; every scheme would be judged on its merits. If on their part the Universities sent their ideas and suggestions to the Council as to how the resources at their disposal could be better utilised in advancing agricultural and veterinary research, they would be welcome. A statement explaining what

facilities for such research are available at the Universities would prove very useful. Further it would be helpful if the observations made by Rao Bahadur Viswanath were considered in the first instance by the Inter-University Board and the Chairman requested the University members of the Advisory Board to take the matter up with the Inter-University Board. Meanwhile, the Council will also further examine the suggestion and ascertain how far it is actually feasible. This was agreed to.

ITEM No. 5.

1. *Application from the National Academy of Sciences, India, Allahabad, for an annual recurring grant of Rs. 1,000.*

2. *Application from the Editor-in-Chief, 'Current Science', Bangalore, for an annual grant of Rs. 500.*

3. *Application from the Indian Science News Association, Calcutta, for a subvention from the funds of the Imperial Council of Agricultural Research (no amount has been specified).* (Appendix V.)

In view of the fairly comprehensive publication work undertaken by the Council and of the fact that if the grant is made to one scientific institution it becomes difficult to resist similar applications from others, the Advisory Board did not recommend the applications.

ITEM No. 2-A.

Reconstitution of the Standing Wheat Committee.

ITEM No. 6.

Recommendation of the Conference of Ministers on Agricultural Marketing, 1938, regarding the setting up of a standing committee for Crop planning under the Imperial Council of Agricultural Research—Report of a preliminary Sub-committee. (Appendices VI and VII.)

The Chairman invited the views of members on the question which he had raised in his opening speech, *viz*. about the feasibility of having Standing Committees constituted for all subjects and arranging for them to meet at different times instead of all of them meeting at the time of the Advisory Board. He also invited attention to item 6 of the agenda which might be considered along with this subject. It would be recalled, he said, that at the Conference of Ministers on Agricultural Marketing a suggestion was made for the appointment of a Standing Committee for Crop-planning. That matter was placed before the Advisory Board at its last meeting and it was decided to refer it to a small Sub-committee for making practical suggestions as to the best form that such a Committee should take. The suggestions of that Sub-committee were now embodied in the note on Item No. 6. The main points were that there should be Standing Commodity Committees for subjects like Rice, Wheat, Sugarcane, Fodder and Grazing, Dairying, Livestock, Fruits and Vegetables, Fish, Tobacco, Oilseeds, Hides and Skins and Wools. Each of these Commodity Committees should be sub-divided into two, *i.e.* a research Sub-committee and an Economic Sub-committee. The, latter consisting among others, of representatives of producers, manufacturers, exporters and the Marketing staff, should con-

sider and formulate proposals on economic aspects of schemes for the consideration of the full committee. He invited the views of members on these points and on the question of the personnel of the Committees and the possbility of their meeting at times other than that of the meeting of the Advisory Board.

Mr. Allan said that there was everything to be said in favour of the Standing Commodity Committees. He approved of the idea of the constitution of Commodity Committees but was doubtful about the feasibility of holding their meetings at times other than at the time of the meeting of the Advisory Board for various reasons, the most important being the question of provision of travelling allowance. This difficulty could however be partly solved by holding the meetings of two or three committees together.

Mr. Rama Reddi favoured the idea of constituting Standing Commodity Committees but felt that the Madras Government would not be able to spare money to let half a dozen officers come to attend these meetings during the course of the year.

Dr. S. K. Mitra was of the opinion that the Standing Committees should meet at the same time as the Advisory Board but if for some reason this is not possible two or three committees shuld be grouped together so as to reduce the number of visits of provincial officers as much as possible.

Mr. Mozumdar said that he could visualize one difficulty which he was sure would be felt by other small provinces like Orissa, namely that on account of a limited number of officers practically the same man had to attend such meetings every time. If therefore the proposed Standing Committees were held separately it would not be possible for such an officer to attend without detriment to his other duties. Further, he pointed out in regard to paragraph (e) of the note circulated on the subject, that the submission of the recommendations of the Central Committees direct to the Governing Body would be repugnant to the powers of functions of the Advisory Board as laid down in the Rules and Regulations of the Council. Dr. Burns agreed with Mr. Mozumdar in that there was nothing in the constitution of the Council that made it legitimate for a Standing Committee, even though constituted by the Governing Body, to report direct to the Governing Body.

Mr. Stewart said that whether legitimate or not it was inadvisable to adopt such a policy because no Director of Agriculture could possibly foresee issues which were going to arise during the sitting of a committee on which a junior representative might be present and further that junior representative might not in many cases be in a position to state the policy of his Government. In his opinion, it was therefore advisable that the recommendations of these Committees should be seen by the Advisory Board.

Sir Dattar Singh, while agreeing with the views of Mr. Stewart said that if non-officials were also to be appointed on the Standing Committees proposed to be held separately from the meetings of the Advisory Board, he was afraid it would be difficult for them to attend such meetings because instead of coming twice a year they would have to come four or five times.

The Chairman in summing up said that it was generally agreed that,

1. recommendations of the Standing Committees, whether on the economic or the research side, should go through the Advisory Board ; and

2. the *ad hoc* Committees should be converted into Standing Committees.

The next point to be considered was whether they should meet at the same time as the Advisory Board met or meet at different times of the year.

Mr. Ware raised the question of the size of these Committees. At the last Animal Husbandry Wing meeting when some Standing Committees on the Animal Husbandry side were appointed, it was accepted that these Standing Committees should consist only of about five experts on a particular subject. In the early days the Committees worked well, for they consisted of 8 or 9 members only. But since then some of the Committees had grown out of all proportion, *e.g.* one of them had now 88 members on it. He suggested that for the better and efficient disposal of work a maximum and a minimum limit should be specified in respect of the size of these Committees.

Mr. Carpenter supported the suggestion made by Mr. Ware and said it was impossible to do justice to the work in a big committee. All that was wanted was a small technical committee which could always co-opt any specialist considered necessary in regard to a particular matter. He therefore, suggested that a special committee inside the Standing Committee consisting of about half a dozen technical members should be set up to examine the technical reports. The Standing Committees would also consider the reports as a whole but not in detail. In regard to the time of holding the meetings of the standing committees, he understood that it was extremely difficult to have the meetings at the time of the Advisory Board and it was also difficult to get the provinces to send their representatives at any other time on account of the difficulty of sparing the officers and the question of their travelling allowance but it might be possible to collect only a few technical officers to consider these reports at some other suitable time. Rao Bahadur Viswanath said that in order to overcome the difficulty expressed with regard to travelling allowance, it would perhaps be better for the small technical committees to meet somewhere about the central part of the country so that the strain on the travelling allowance budget might be equally distributed amongst all.

Mr. B. S. Patel said that it would perhaps be convenient if the technical programmes, annual progress reports and other similar items could be considered by the technical members of the standing committees, who would form the sub-committee. The opinions would then be placed before the standing committee. Possibly these papers could also be circulated and the comments of the members of the sub-committee obtained if that was more convenient and there was sufficient time to do so.

The Chairman at this stage asked for the views of the Board as to the size of the standing committees. The reason why these committees had increased to their present size was that every Province and every State wanted to be represented on every committee. But if the principle of limiting the membership of these committees was accepted, it would not

be feasible to have every Province and State represented thereon. Dr. S. K. Mitra said that limiting the membership of the standing committees to few would not be desirable as research workers of different Provinces would be required to explain the progress and their work. Mr. Livingstone said that so far as the economic sub-committee of the commodity committees was concerned, he did not anticipate that there would be representation on a provincial basis. One representative from the trade and other from the millers associations of commodities like oil-seeds and tobacco will adequately represent the interests of such commodities.

Rao Bahadur Viswanath said that the standing committees might be left at their present size and might meet at the time of the Advisory Board. These standing committees might however be divided into small sub-committees to consider scientific schemes and reports and the reports of the sub-committees might be submitted to the standing committees.

Mr. Rama Reddi said that the Board might follow the example of the Indian Central Cotton Committee and divide the standing committee into three or four sub-committees whose reports may be discussed in the main committee. Dr. Burns suggested that to facilitate matters these committees might meet only once a year instead of meeting twice. Sir Datar Singh suggested that the sub-committees and standing committees might meet a few days before the Advisory Board and the halting allowance of members for a few days, in addition to the days of the Advisory Board, would not be considererable when compared to the travelling allowance that would have to be paid if the members were asked to come more than once.

Dr. Minett said that his experience was that if the standing committees were divided into sub-committees and the latter were allowed to meet earlier, the length of time taken would not be as great as was anticipated.

Mr. Livingstone pointed out that in regard to the tobacco and oil-seeds committees, as the trade members would not be able to attend any meetings of the committees in the season, those committees should meet only in the off-season.

The Chairman summing up the discussion said that the general view of the Board was that small sub-committees of the standing committees should be constituted and their meetings be held immediately before the meetings of the standing committee and the Advisory Board both of which should consider their reports ; but if in the case of certain standing committees like Sugar, Rice, Wheat, Tobacco and Oil-seeds the dates were required to be altered to suit the convenience of representatives of trade and growers they may be arranged accordingly. The Chairman then enquired the views of the Board as to the number of membership of the standing committees whether they should be reduced or left at their present strength. He suggested that it might be adopted as a general principle that on the research side of the standing committees each province should have only one representative. Mr. P. H. Carpenter said that the standing committees should be constituted on the same lines as they were at present and they should appoint their own sub-committees consisting of 5 or 10 or whatever number they considered necessary.

Mr. Allan was of the opinion that the personnel of these standing committees should be kept down. Mr. Rama Reddi said that he did not see any difficulty in having a larger number of members on each stand-

ing committee. It was not necessary that all these members should be included in the *ad-hoc* committees. Only such persons who were required to explain the progress of their work and would be helpful in the general discussion of scientific subjects should be appointed on the *ad-hoc* committees. This would also help the committee in disposing of the work quickly.

Dr. Burns said that this arrangement would double the time required on account of the fact that everything would have to be discussed first in the sub-committee and then in the standing committee. Where the work was now disposed of in 3 hours, it will take 6 hours according to the new arrangement. Dr. Minett thought that the work would be done more expeditiously. Another view expressed was that the work would be increased by at least 30 per cent.

The Chairman summing up said that on the whole it seemed that standing committees should be appointed and sub-committees thereof might do a good deal of the technical work as had recently been done in the case of the Rice Committee. He suggested that the question of fixing the personnel of these committees might be considered when the Advisory Board next meet on Monday.

The Chairman next enquired for what subjects standing committees should be constituted.

Rao Sahib Thadani enquired whether dairying, animal nutrition and animal breeding subjects could not be discussed in one committee.

Dr. Minett said that they were separate branches of animal husbandry and a separate committee was required for each.

Dr. Burns said that there must be a separate committee for miscellaneous crops. In the present agenda of the Botanical and Physiological Committee there were quite a number of items that would not fit in it. There were also some general questions with regard to plant diseases which seemed to require another committee.

Professor Mahalanobis said that last year a committee was set up for experimental field work and satistical work and enquired whether it was now proposed to abolish that. The Chairman said that that was an *ad-hoc* committee set up for a particular purpose. The Committee had not been abolished but a meeting of that committee had not been called in conjunction with the present meeting of the Advisory Board, as there was not enough work for it.

Mr. McDougall said that it was hardly necessary to have a separate committee for fruit research schemes and they could possibly be included in the miscellaneous committee suggested by Dr. Burns. Dr. Burns agreed with Mr. McDougall.

Mr. Allan objected to the inclusion of trade representatives on some of the committees, *e.g.* the fruit committee and the dairying committee.

Mr. Livingstone said that the Council wanted to develop the manufacture of fruit products and the trade in fruit and fruit products. Work on this was advancing very rapidly and they needed the help of manufacturers, merchants and traders who deal in fruit products. In the same way the dairying committee is lacking in so far as it does not have representatives of the ghee trade.

Mr. Ware said that on the animal husbandry side standing committees were required for dairying, animal breeding and animal nutrition. Animal breeding would include all breeding work excepting that of sheep and goats for which a separate committee should be established. A separate committee for animal pests and diseases which would include helminthology and entomology and *ad-hoc* committees for apiculture and pisciculture should also be set up.

Dr. Burns saw no harm in having a long list of committees which need not be called if there was no work for them, but he wanted separate committees for statistics, soil science, and botany and physiology.

Mr. Mozumdar was not clear as to why it was proposed to change the entire system and constitute a separate central economic Committee. He enquired whether the previous practice had been found unsatisfactory.

Mr. Livingstone explained the genesis of the proposal and said that the Governing Body had been laying emphasis in doing more work on lines by which the economic position of the cultivator could be improved. To give this idea a practical shape the setting up of a crop-planning committee was recommended. The present proposals are the result of recommendations made by a preliminary *ad hoc* committee appointed to consider the question of the constitution of a Crop Planning Committee.

Mr. Patel said that if the proposed Standing Commodity Committee were set up, there would be duplication of work and overlapping. For instance the Standing Livestock Committee would also have to consider matters relating to animal breeding and animal nutrition. Similarly the agricultural commodity committees would also have to consider several questions relating to soil science, plant physiology, plant breeding, etc. for all of which separate *ad-hoc* committees are always constituted. He suggested that committees should be set up to deal with a particular subject and not a particular commodity. The Economic Development Committee could consider questions relating purely to commodities.

Mr. Mazumdar said that the present Advisory Board was fully representative of most of the interests, *e.g.* Agriculturists, Economists, Scientists, Directors of Agriculture and Veterinary Services. Instead of setting up more committees, he suggested an increase in the personnel of the Advisory Board in order to bring in trade interests, etc. In his opinion there was no point in having a Central Standing Committee on Economic Development. In reply it was pointed out that there was no representative of trade on the Advisory Board.

Dr. Burns said that it was better to have a committee to devote the whole of its time to a particular crop rather than to a particular subject. It would be an advantage to have on each of these commodity committees, one or two plant breeders who could be of assistance in giving technical information. It was worth while trying this experiment. The members of a Commodity Committee would give a fair amount of criticism on particular schemes and then the matter together with the report of the Standing Committee could come for criticism and consideration in the Advisory Board itself.

Sir Datar Singh said that it was highly desirable to bring the economic side parallel to the research side. So far only research had received their attention. There were no representatives of the trade, producers, etc. on

the Advisory Board. He was, therefore, strongly in favour of setting up the Central Standing Committee on Economic Development.

Mr. Nizamuddin Hyder enquired what would be the relation of the Central Committee with the Advisory Board and what will be the functions of the Advisory Board when this Committee comes into existence. It was stated in reply that the Central Economic Committee would be like an Advisory Committee to the Advisory Board on economic matters. All the recommendations of the Economic Committee will pass through the Advisory Board to the Governing Body.

Mr. Allan suggested that the Advisory Board should be split up into an Economic Section and a Research Section. In reply it was pointed out that the disadvantage of splitting up the Advisory Board in this manner would be that the research workers would be even less associated with practical questions than they now were. No doubt the research workers would be associated with the trade interests in the committees but the original idea was that all the recommendations of the Standing Committee should pass through the Board.

Mr. Carpenter said that the economic questions could be discussed in the existing Standing Committees.

The Chairman suggested that a trial may be given to the proposal of setting up an Economic Committee and the Standing Commodity Committees suggested and if any difficulty was experienced in carrying on the work expeditiously, the question of splitting up the Advisory Board as suggested by Mr. Allan might be taken up with the approval of the Advisory Board and the Governing Body.

Mr. Carpenter suggested that a representative of the Indian Statistical Institute, preferably Professor Mahalanobis, should be on 'the Committee.

Sir Datar Singh said that it was proposed that one representative elected by each of the Standing Commodity Committees should be included in the Economic Committee. This was likely to upset the balance on it between the technical men and the traders and growers interests. To avoid this he suggested that two representatives should be elected to it by each of the Standing Commodity Committees, one representing the official or technical side and the other representing the trade interests.

Mr. Subba Rao suggested that one representative of the theory of economics, *e.g.*, a Professor of Economics should be represented on the Central Committee. The suggestions of Mr. Carpenter, Sir Datar Singh, and Mr. Subba Rao were accepted.

At this point the Chairman said that the discussion on this subject might be continued on December 5, when definite proposals regarding the constitution of the Committees would be put up. On the discussion of the subject being resumed on December 5, 1939, to consider the concrete proposals put up (see appendix VII-A.) Sardar Bahadur Sir Datar Singh enquired, whether it was proposed to dissolve all the committees, whether standing or otherwise, that were mentioned in the papers circulated to the Board. In reply it was explained that the standing committees which had been appointed by the Governing Body could not be

altered by the Board unless and until the Governing Body made any amendments in their constitution. The Board was primarily concerned with those committees which were not standing committees.

Dr. Burns said that if that was the intention then his note had been put up under a slight misapprehension. He, therefore, suggested that the constitution of the Oilseeds and Fruit Committees be considered for the present.

Constitution of the Fruit Committee.

He proposed that Mr. Carpenter be added to the Fruit Committee.

Mr. Allan proposed that the Horticulturist, Baroda, be added to the Fruit Committee.

Mr. Stewart said that the Fruit Committee did not inclnde a representative of the Punjab Fruit Development Board. In this connection he said that Mr. Mitchell was put on the Committee and though he was a member of the Fruit Development Board, Punjab, he was also a reserve officer of the Army and was likely to be called up soon. In that case the Punjab Fruit Development Board would go unrepresented during the war. He therefore suggested that another representative of that Board be added to the Fruit Committee in addition to Mr. Mitchell.

Rao Sahib Thadani said that Sind should be represented on the Fruit and Oilseeds Committees. They were developing both these commodities to a very great extent.

Mr. Livingstone did not think that it would be possible to include the representatives of all the provinces. They should have representatives of all interest. It did not matter from which province they come.

Khan M. Aslam Khan said that the North-West Frontier Province had not been represented on the Fruit Committee.

Mr. Nizamuddin Hyder proposed the inclusion of the Horticulturist, Hyderabad, instead of the Economic Botanist.

Mr. Patel enquired whether it would not be desirable to leave vegetables to be dealt with by a miscellaneous committee. He thought that by including vegetables in the Fruit Committee the cultivation side of vegetables would be overlooked.

Mr. Stewart enquired why the Sugar Technologist, Cawnpore was proposed to be on the Fruit Committee. Mr. Livingstone said that the assistance of the Sugar Technologist was required in various matters concerning the fruit trade.

In answer to the point raised by Mr. Patel, Dr. Burns said that he understood that they were going to call the Committee as a Standing Fruit and Special Crops Committee. Apart from potatoes the question of vegetables was going to be taken up more seriously than had been done hitherto. He saw no objection to vegetables being grouped with fruit. Mr. Patel maintained that the Fruit Committee would not be the proper body to deal with vegetables.

The Board agreed to call the Committee a "Fruit and Vegetables Committee" and to the following personnel for it :—

1. Agricultural Commissioner with the Government of India.
2. Mr. Naik (Kodur).
3. Dr. G. S. Cheema, Horticulturist, Bombay.
4. Director of Agriculture, Central Provinces.
5. Director of Agriculture, United Provinces.
6. Fruit Specialist, Punjab.
7. Economic Botanist, Bengal.
8. Fruit Specialist, Sabour.
9. Dr. V. K. Badami.
10. Director of Agriculture, Assam.
11. Agricultural Officer, Baluchistan.
12. Mr. J. H. Sprott, Coorg.
13. Director of Agriculture, Kashmir
14. Horticulturist, Baroda.
15. Director of Agriculture, Mysore
16. Horticulturist, Hyderabad.
17. Imperial Economic Botanist.
18. Imperial Mycologist.
19. Imperial Entomologist.
20. Horticulturist, North-West Frontier Province.
21. Mr. G. E. Wakefield, N. I. Farms, Rawalpindi, (Representative, Fruit Growers).
22. Agmarks Packers' (Madras Orange Growers.)
23. United Provinces Fruit Development Board.

24, 25. Two representatives, Potato Growers. (Agmark Packers—Nilgiris. The Nilgiris District Potato and Agricultural Produce Growers Co-operative Sale Society, Ltd., Ootacamund, Anaikara Street, Mettupalayam.
Agmark Packers—Bihar.
Bihar—Shariff Potato, Marketing Association, Bihar-Sharif Patna).

26, 27, 28. Three representatives, Fruit Products Manufacturers.
Captain Mitchell, Punjab.
A member of the Fruit Development Board, Punjab.
Madhu Canning Co., Bombay.

29. Sugar Technologist, Cawnpore.

30, 31. Two representatives, Fruit Merchants and Distributors :—
Dhoble & Co., Crawford Market, Bombay.
Fruit Merchants Association, Delhi.

32. 33. Two representatives, Nurserymen—
L. R. Brothers, Saharanpur.
Messrs. Munniswamy & Sons, Bangalore.

34. One Senior Marketing Officer in charge, fruits and vegetables.

35. Mr. P. H. Carpenter.

Constitution of the Oilseeds Committee.

Mr. Rama Reddi said that he may be put on the Oilseeds Committee instead of the Oilseeds Specialist, Madras. There was very little likelihood of his government agreeing to meet the travelling allowance of his junior staff for attending meetings in Delhi. In fact his government were asking him to attend the various meetings.

Mr. Allan pointed out that in the proposed personnel, the agricultural side had been overlooked while plant-breeding had heen strongly represented.

It was proposed that the Director of Agriculture, Madras and Director of Agriculture, Bombay should he added to the list, and that the Economic Botanist, Mysore, should be substituted for the Director of Agriculture, Mysore.

The Board approved of the following personnel for the Committee.

1. Agricultural Commissioner, with the Government of India.
2. The Director of Agriculture, Madras.
3. Oilseeds Specialist, Madras.
4. The Director of Agriculture, Bombay.
5. Economic Botanist, Bombay.
6. Oilseeds Specialist, Central Provinces.
7. Economic Botanist, United Provinces. (Mr. Sabnis).
8. Oilseeds Specialist, Punjab.
9. Economic Botanist, Bengal.
10. Economic Botanist, Bihar.
11. Economic Botanist, Mysore.
12. Director of Agriculture, Travancore.
13. Economic Botanist, Hyderabad.
14. Imperial Economic Botanist, Imperial Agricultural Research Institute.
15. Imperial Mycologist, Imperial Agricultural Research Institute.
16. Imperial Entomologist, Imperial Agricultural Research Institute.

Constitution of the Tobacco Committee.

Mr. Rama Reddi proposed that the Deputy Director, 1st Circle be substituted for the Economic Botanist, Madras.

Mr. Nizamuddin Hyder proposed that the Deputy Director of Agriculture be substituted for the Economic Botanist, Hyderabad. Dr. Hedayatullah proposed the Agricultural Chemist, Bengal, instead of the Economic Botanist.

Mr. Stewart proposed the Millet Specialist, Punjab, who was doing work on Tobacco instead of the Economic Botanist.

Mr. McDougall proposed the Director of Agriculture instead of the Economic Botanist, Central Provinces.

It was proposed that the Director, Imperial Agricultural Research Institute be added to the list.

All these proposals were approved by the Board. The personnel of the Committee as finally approved is as follows :—

1. Agricultural Commissioner with the Government of India.
2. Deputy Director of Agriculture, 1st Circle, Madras.
3. Tobacco Breeder, Gujrat, Bombay.
4. Director of Agriculture, Central Provinces.
5. Economic Botanist, United Provinces.
6. Millet Specialist, Punjab.
7. Agricultural Chemist, Bengal.
8. Economic Botanist, Bihar.
9. Dr. Badami, Orissa.
10. Agricultural Commissioner, Baroda.
11. Director of Agriculture, Mysore.
12. Deputy Director of Agriculture, Hyderabad.
13. Director, Imperial Agricultural Research, Institute.
14. Imperial Economic Botanist, Imperial Agricultural Research Institute.
15. Imperial Mycologist, Imperial Agricultural Research Institute.
16. Imperial Entomologist, Imperial Agricultural Research Institute.

Constitution of the Livestock and Dairying Standing Committees.

Mr. Ware said that he had drawn up Livestock and Dairying Standing Committees on the assumption that the other Standing Committees which were functioning at present would be disbanded. The Animal Nutrition and Animal Breeding Committees had been included in the Livestock Committee as a result of discussion with the experts of the Council. Livestock development in this country was in a very backward state and the number of experts engaged in the task were incommensurate with the size of the country and the complexity of the problems involved. Schemes received from different provinces were placed before a large committee where their acceptance was to some extent influenced by canvassing. Moreover, discussions in a large committee became diffused. He therefore suggested small Sub-Committees for

Animal Diseases, Animal Nutrition and Animal Breeding composed of five scientific members, for scrutinising schemes referred to the Livestock Standing Committee without regard to caste, creed or province. He proposed a separate Standing Committee for Dairying. All other livestock products and industries would for the present be dealt with by one large Standing Committee but it was the intention eventually to separate such industries as wool, poultry-keeping, hides and skins from the Livestock Committee in the same way as the dairying industry had been separated.

With regard to the personnel proposed, he had not been able to include representatives of all provinces and states but had included a majority of them and he hoped that this would be accepted by the Board.

Sir Datar Singh said that he did not understand how it was proposed to appoint the standing committees on the animal husbandry side. He said that in forming these committees the policy adopted in the case of agriculture and animal husbandry should be the same. The Agricultural and Marketing sides were adopting the old procedure, whereas for the Animal Husbandry side it was proposed to depart from the old practice. He deprecated the idea of having two policies in one and the same body.

Mr. Badami stressed the point that the personnel of the committees should be enlarged. If there were only a limited number of people in a Committee, there was the risk of members not attending the meetings and consequently of decisions being taken by one or two individuals. He said that if representation was not given on a provincial or State basis, then members should be selected either for their scientific work or for their practical experience.

Mr. Allan enquired whether appointment to these was by name or by designation. Mr. Farbrother raised the same point and said that it would be better if the appointments were made by designation.

Mr. Ware in reply to Sir Datar Singh said that the Livestock and Dairying committees had been constituted to fall in line with crop commodity committees. In the early days these standing animal husbandry committees were scientific committees and now it was proposed to constitute them as commodity committees and include trade representatives also.

As regards Mr. Badami's contention to strengthen the scientific side, it would be seen that the scientific and trade wings had been given equal representation, *viz.,* nearly 50 : 50. This was in conformity with Mr. Livingstone's request.

The third point which had been raised was in regard to the nominations by name or designation. Mr. Ware said that the Board cannot expect to get an expert sub-committee if appointments were made by designation. It was therefore necessary to appoint members by name.

In reply to Sir Datar Singh, Mr. Ware replied that he presumed that the existing standing committees would be dissolved as soon as the proposed new committees were approved by the Governing Body.

Mr. McDougall said that so far as the Central Provinces was concerned, there was no representative from the Animal Husbandry side.

The only person who was appointed was Rao Bahadur D. V. Bal wl belonged to the Agriculture Department.

Dr. S. K. Mitra also pointed out that there were no representativ from Assam and that they should have one on the committee. Mr. K. : Narayana Iyer also said that the States were not represented on tl committees.

Dr. Minett said that on the question of expert sub-committee he wa rather doubtful whether some of the people mentioned in the list coul really be called experts. He said that if he were put on an expert con mittee he should object, because Directors of Institutes were not suppose to be experts in any one subject. On the other hand, if a bacteriologica question came up for discussion in any scheme, he would refer the matte to the Bacteriologist of the Institute. Dr. Minett said that selection o members should not be made on a geographical basis, but selection shoul be made according to the expert knowledge one possessed and that the sub committee should not exceed 7 or 8 in number. He also raised the poin why one or two appropriate trade representatives should not be put or the expert sub-committee. This would have the advantage of obtaining the views of the trade representatives quite early in the enquiry. He added that the great advantage of small sub-committees was that the matters could be pushed forward very much better than in a big committee. If there were too many trade representatives there was the danger of submergence of science and the Council would lose its research outlook. If the Council were to branch out in these ways, it seemed to him that the title of the Council should be changed into 'Imperial Council of Agricultural Research and Development'.

In summing up the discussion, the Chairman said that the difficulty was a constitutional one, *viz.*, that the existing Standing Committees were appointed by the Governing Body and the Board could not over-rule the decision of the Governing Body. The simplest course would, therefore, be to let the existing Standing Committees continue until their present term expired, and when fresh nominations were made, the Board could give its views on whatever lines they might wish to constitute them. In the meantime the only way the Board could secure the object in view—*viz.*, to have an economic section concerning the livestock work—was by having the names which had been suggested on behalf of the trade, etc., as additional to a certain number of selected people from the different Standing Committees ; to constitute a Standing Livestock Committee that is to say five people from each of the Standing Committees and 20 representatives of the traders would make up the livestock committee. The disadvantage was that the Standing Committees were still too big to be able to effectively examine the reports and the programmes that came up before these Committees. He suggested that each of these Standing Committees might divide up the work amongst a certain number of members, say five members on each, who would look to a group of schemes, the Standing Committee securing co-ordination between those sub-committees. That was exactly what the Indian Central Cotton Committee was doing. That Committee had got an Agricultural Committee and the items which came up before it were so many in number on the last occasion that four separate sub-committees consisting of five or six people each had to be formed. Then these sub-committees submitted their report to the Agricultural

Research Committee which then co-ordinated them all and submitted its report to the main Cotton Committee. If the Board could work the existing Standing Committees somewhat along these lines, they would be able to achieve the object they had in view. A standing committee for Animal Diseases might be constituted on the same lines as the one appointed for the present meeting of the Board.

The above suggestion was agreed to.

The Chairman said that there was one more important point, *viz.*, that the Board had not yet constituted the Central Economic Committee which was to co-ordinate all the economic side of the work. Members of that Committee were to be nominated by each Standing Committee and to that some Professors of Economics from Universities, statistical men and people like that had to be added. That would, however, be considered at the next meeting of the Advisory Board.

ITEM No. 7.

Fruit Research. Progress Reports, 1938-39.

(a) *Punjab—citrus stocks and grape vines.*

(b) *Fruits and vegetable preservation scheme, Punjab.*

(c) *Punjab cold storage.*

(e) *Bombay cold storage (1938 season).*

(g) *Bihar (Sabour).*

(i) *Assam.*

(l) *Baluchistan fruit canning.*

The above progress reports were approved. (Not printed).

(d) *Madras (Ananthararajupetta).*

(f) *Bengal (Krishnagar).*

(h) *Central Provinces and Berar (Nagpur).*

(j) *North-West Frontier Province.*

(k) *Mysore.*

The above progress reports were not before the Committee, as they were not received in time for consideration at the meeting.

ITEM No. 8 (*a*).

Technical programme.—Bombay scheme of cold (and gas) storage research.

(Appendices VIII and VIII-A.).

The Fruit Sub-Committee noted that in the programme it was contemplated to determine the effect of different concentrations of carbon dioxide during the first year and of temperature during the following year. This did not appear to be scientifically sound as the interactions between these two factors are important. The Committee recommended that variants of the two factors should be combined. Dr. Cheema said that the proposed arrangement was made to relieve pressure on the staff. Dr. Burns said that the Committee's suggestion could be carried out without undue pressure on the staff by cutting down the number of

concentrations of carbon dioxide and temperature to two or three, the whole plan of work being settled in consultation with the Statistician. The Committee agreed with the suggestion and subject to these changes approved of the programme.

Subject to the remarks of the Sub-Committee, the Advisory Board approved the technical programme.

ITEM No. 8 (*b*).

Technical programme.—Fruit Research Station, Sabour (Bihar).

(Appendix IX.)

At the Fruit Sub-Committee, Dr. Burns explained that he had, through the good offices of the Imperial Bureau of Horticulture, got into touch with workers on papaya genetics throughout the world and obtained valuable information and also some seeds. The information had been passed on and the seeds distributed to workers in India. The Sub-Committee approved the technical programme.

The recommendation of the Sub-Committee was accepted by the Advisory Board.

ITEM No. 8 (*c*).

Technical programme.—Hill Fruit Research Scheme, Chaubattia (United Provinces. (Appendix X.)

The technical programme, as approved by the Fruit Sub-Committee, was adopted.

ITEM No. 9 (*a*).

Extension of Fruit Research Scheme, Bengal, beyond 1st March 1940. (Rs. 15,912 for two years.) (Appendix XI.)

At the Fruit Sub-Committee it was pointed out that some portion of work particularly on papaya such as vegetative propagation trials and effect of pruning on the change of sex had already been done and there was no necessity of repeating this work. It was also considered that the experiments were of too elementary a nature and the programme was rather vague. The Committee was also handicapped in its consideration of the proposal for extension by the lack of the progress report of the station. The Committee recommended the extension of the scheme for one year only.

The Board endorsed this recommendation.

ITEM No. 9 (*b*).

Fruit Research Extension Scheme—Baluchistan Fruit Canning Revised Scheme. (Appendix XII.)

The Fruit Sub-Committee, which considered the scheme first rejected the demands for the additional grants, *in toto*. The technical programme had not been revised and requests for additional apparatus, turned down at the last meeting, had been repeated. As regards additional amount for contingencies the Sub-Committee held that if the Baluchistan Government desired to run the canning plant on a semi-commercial scale they should

provide the cost thereof. They would in any case obtain the income from the sale of the canned goods.

The recommendation of the Sub-Committee was agreed to by the Board.

ITEM No. 10 (*a*).

Application from the Government of the United Provinces for a grant of Rs. 25,633 spread over three years for investigations on the black tip disease of mangoes by Dr. S. N. Das Gupta of the Lucknow University. (Appendix XIII.)

At the Fruit Sub-Committee Mr. Vishnu Sahay introduced the scheme and explained the lines of working. Dr. Cheema said that a survey of whitish pulp disease of mangoes should also with advantage be combined with the survey of black tip disease. The desirability of doing so was questioned, and it was decided that if necessary, this disease could be taken up at a later stage. The necessity of soil analysis in this investigation being questioned, Dr. Padwick explained that physiological diseases of this nature were often found to be caused by upsetting of water relations and it was for this reason that most of the determinations in this connection, such as mechanical analysis of soil, soil moisture and water holding capacity dealt with that aspect of soil work. The Committee recommended the proposal in the form put up by the United Provinces Government.

The Board endorsed the recommendation of the Committee.

ITEM No. 10 (*b*).

Application from the Government of Bengal for a grant of Rs. 18,690 spread over five years for a scheme of research on the cytogenetics of (1) Mangifera Indica including the cultivated mangoes (2) Musa paradisiaca var Sapientum including cultivated bananas by Professor S. P. Agharkar. (Appendix XIV.)

At the Fruit Sub-Committee Professor Agharkar introduced the scheme. Dr. Burns explained the importance of the work by quoting references from the Imperial Bureau of Plant Genetics. The Committee felt that the two microscopes and the journals and works of reference should be provided for by the University and hence the sum of Rs. 1,500 asked for two microscopes should be deleted and the sum of Rs. 800 under contingencies which included journals should be reduced to Rs. 500. Professor Agharkar said he had already been able to secure one microscope. He accepted the emendations.

Subject to these alterations, the Sub-Committee recommended the scheme.

The Advisory Board accepted the alterations suggested by the Sub-Committee and recommended the scheme as modified for sanction.

ITEM No. 10 (*c*).

Application from the Government of the North-West Frontier Province for a grant of Rs. 44,940 spread over five years for a scheme of research work on fruit and vegetable drying. (Appendix XV.)

At the Fruit Sub-Committee Mr. Aslam Khan introduced the Scheme. The Sub-Committee was of the opinion that the work of drying of fruits

and vegetables proposed in the scheme was important and still more so at the present time. The staff demanded, however, was rather on the high side. Such items of the programme as canning and preparations of squashes should form a provincial responsibility as the Council had already subsidised such investigations elsewhere.

The Sub-Committee did not consider it desirable to subsidise a Fruit Expert whose attention would be divided between canning and drying of fruits and recommended that the post of the Officer-in-Charge should be a Class II appointment with the proviso that he should be whole-time on the drying work. The Sub-Committee suggested that the following items of expenditure be approved :—

> One Fruit Preservation Expert, on Class II Scale, one Biochemist with a start of about Rs. 100, one Laboratory Assistant, one Peon, Contingencies of Rs. 1,000 per year and Travelling Allowance of Rs. 500 per year.

At the meeting of the Board, the Chairman said that he had just been presented with two specimens of the fruit dried at the Ternab Farm. A point for consideration in respect of this scheme was that if the local government was already doing the work on what appeared to be a commercial scale, why was it necessary to finance it any further.

Mr. Mohd. Aslam said that the specimens which were before the members were the result of efforts on the part of the Provincial Agricultural Department but as would be observed they were not really up to the standard and did not stand comparison with the stuff imported from abroad. It was highly desirable that this work should be improved and should be done more scientifically so that a system might be evolved which could be recommended to the Zamindars for adoption in a commercial scale. The present staff employed at the Tarnab Farm was small and insufficiently qualified and it was not possible to make any further progress. To a further query Mr. Mohd. Aslam replied that fruit for experimentation would be supplied by the Provincial Government as also the necessary machinery and other equipment.

The Board accepted the recommendation of the Sub-Committee and recommended a grant of Rs. * for a period of five years.

Item No. 11 (*a*).

Position in regard to stocks of fruit in India. (Appendices XVI and XVII.)

The note was recorded.

Item No. 12 (*a*).

Progress Report, Bengal (Bankura and Chinsura), 1938-39. (Appendix XVIII.)

At the meeting of the Rice Research Sub-Committee, Mr. Ramiah said that the size of plots in the irrigation trials was rather small and there was considerable seepage of water from the sides. He had visited the station and had found that the water was not spreading uniformly in plots and it therefore appeared to him that one of the causes of incon-

*To be calculated on the basis recommended by the Sub-Committee.

sistency in results of experiments in different years was perhaps the absence of uniformity in treatments. Dr. Hidayatulla said that arrangements had now been made to check the seepage by putting iron sheets between unit plots and the arrangements for watering the fields had been considerably improved since Mr. Ramiah's visit to the station. Dr. Burns said that complex experiments should be carried on to deal with definite local agricultural problems. Subject to the above observations the report was approved by the Rice Committee and by the Board.

ITEM No. 12 (*b*).

Progress Report—United Provinces, Nagina, 1938-39. (Not printed.)

The Rice Research Sub-Committee desired that something should be done to speed up production and distribution of sathi cross. This cross is now in its 11th generation and certain strains are available. If there are difficulties like earliness it should be found out whether these are really obstacles to widespread distribution. Pot experiment was criticised as having been laid out without special reference to the principles of pot experiment technique and hence was giving no valid indications of drought resistance. It was suggested that the technique might be overhauled. Subject to these remarks the report was approved by the Rice Committee and the Advisory Board.

ITEM No. 12 (*e*).

Progress Report of the Deep Water Paddy Research Station, Habiganj. (Assam). (Not printed.)

The report was approved by the Rice Committee and by the Board.

ITEM No. 13 (*a*).

Technical programme of work under the Rice Research Scheme, Central Provinces. (Appendix XIX.)

The technical programme was approved by the Rice Committee and the Advisory Board.

ITEM No. 13 (*b*).

Technical programme of work under the Rice Research Scheme, United Provinces for 1st April 1939 to 31st March 1942. (Appendix XX.)

The Rice Committee endorsed the recommendation of the Sub-Committee that since the various items of the programme were not clearly explained, the Officer-in-Charge of the scheme should send a programme in a detailed form explaining in detail the various field experiments. The programme was otherwise approved.

The recommendation of the Rice Committee was accepted by the Board.

ITEM No. 13 (*c*).

Rice Research—technical programme—Travancore Paddy Research Scheme. (Appendices XXI and XXII.)

The technical programme was approved both by the Rice Committee and the Board.

ITEM No. 13 (*d*).

Technical programme of Baroda Paddy Research Scheme. (Appendices XXIII and XXIV.)

The technical programme for 1940-41 was approved by the Rice Committee and the Advisory Board.

ITEM No. 13 (*e*).

Technical programme of Kashmir Rice Research Scheme. (Appendix XXV.)

The Rice Research Sub-Committee approved of the technical programme for a period of three years from 1940-41. The Sub-Committee suggested that the Council should be furnished with full details in regard to items 4 (manurial experiments) and 6 (water requirements). The Sub-Committee further recommended that item 2 (*b*), i.e., vernalisation should be held in abeyance till a technique had been settled. The question would be discussed at the next meeting of the Crops and Soils Wing of the Board of Agriculture and Animal Husbandry and Mr. Boshi Sen should be consulted.

The recommendations of the Committee were accepted by the Rice Committee and by the Board.

ITEM No. 14 (*a*).

Rice Research Extension scheme, Bengal, beyond 1st April 1940. (Appendix XXVI.)

After discussing the various items in the programme the Rice Research Sub-Committee which examined this scheme at great length, came to the conclusion that items No. 1, Isolation and study of pure lines, and No. 2, yield trials, and a part of item No. 3, Complex cultural experiment on rice, at both the stations Chinsura and Bankura formed definitely provincial responsibility according to the new policy, laid down for financing Rice Research Schemes and should be deleted from the programme of work to be financed by the Imperial Council of Agricultural Research. The Sub-Committee further recommended that to carry out the remaining portion of the programme the staff asked for was rather on the high side and should be reduced to one Rice Research Officer, and two Senior Research Assistants, one at each station. The financial responsibility of the Imperial Council of Agricultural Research would then amount to Rs. 35,280 for four years.

The Rice Committee accepted the above recommendations. In introducing the recommendations of the Committee, Dr. Burns said that in dealing with the extension schemes the Committee were largely guided by the principle laid down by the Council regarding the future policy of rice research, *viz.*, that after 1939-40, the Imperial Council of Agricultural Research should generally limit its assistance for rice research to work on rice genetics, water requirements, and manurial experiments, leaving rice-breeding to be tackled provincially, the Council's assistance should mainly take the form of grants for senior research staff. In dealing with the Bengal scheme, this resulted in the Sub-Committee recommending that the staff asked for should be reduced to one Rice Research Officer and two Senior Research Assistants.

The Chairman raised the point whether the scheme should be renewed for a period of 5 years or for such a period as would ensure that all the rice research schemes might end at practically the same time. In that case it would be possible to review all the schemes together at the end of that period before schemes for renewal came up. Mr. Hidayatullah said that the intention in applying for four years' extension was that the work which had been undertaken would finish by then. He, therefore, requested that the scheme should be extended for that period. Dr. Mitra said that it would be better if all the schemes terminated at the same time, as in that case the Council would be in a better position to review the entire work done in different provinces.

Dr. Burns said that the various provinces had applied for the extension of their schemes for varying periods but a majority of them would terminate by March 1942.

Mr. Rama Reddi enquired as to why it was necessary to terminate all the schemes at the same time.

Mr. Carpenter explained that these schemes were of All-India importance and it would be advantageous to consider them together so as to decide the proper line of research which should be adopted for different provinces and to avoid duplication of work.

Mr. Rama Reddi said that it was the duty of the Research Sub-Committee to see that there was no duplication. He saw no point in starting and completing these schemes at the same time.

Dr. Burns said that there were great advantages in ending the schemes at the same time as the Council could get a complete review of the whole situation.

The Board approved the extension of this scheme till March 31st, 1942, the situation being reviewed in 1941.

ITEM No. 14 (b).

Rice Research Extension scheme, Bihar, beyond 31st March 1940.

At the Rice Committee Dr. Burns said that a revised scheme was due from the Provincial Government, but was not received. Hence the Research Sub-Committee decided to consider the extension scheme and its programme in the existing form in the light of the general policy laid down by the Council ; approved items 4, 5 and 6 of the programme and recommended that only the Rice Specialist, the Assistant Botanist (omitted by mistake in the cyclostyled proceedings), one Senior Research Assistant, one Junior Research Assistant and one Statistical Computor should be provided for by the Council. The Committee accepted the recommendation of the Sub-Committee excepting that the Provincial Government should be asked to bear the cost of the pay of the Aissistant Botanist, as a set-off against the relief in expenditure which they enjoy by employing a substitute at a low rate of pay in place of the Rice Specialist, whose pay is fully borne by the Imperial Council of Agricultural Research.

The Board recommended the extension of the scheme as modified by the Rice Committee, *i.e.*, on the condition that the Provincial Government agreed to bear the cost of Assistant Botanist up to 31st March 1942.

ITEM No. 14 (c).

Rice Research Extension Scheme, Orissa, beyond 19th January 1940.

As the revised programme of this scheme had not been received, the Rice-Committee considered this scheme precisely on the same lines as that of Bihar. The Committee decided that just as the Council was meeting at present only 50 per cent of the expenditure of the Jeypur station, the other 50 per cent. being met by the Maharaja, the future extension of the scheme should be sanctioned on 50 ; 50 basis.

At the Advisory Board Mr. Rama Reddi pointed out that as breeding work was included in this research, he would like this exception to be noted.

The recommendations of the Committee were accepted.

ITEM No. 14 (d).

Continuance of the Research in deep water paddy in Assam beyond 1st April 1940. (Appendix XXVII.)

The Rice Committee considered that the previous recommendation of the Board of provision of Rs. 26,200 during the three years 1940-41 to 1942-43 by the Imperial Council of Agricultural Research should be adhered to, and that Dr. Mitra and Mr. Majid should go over the programme with the Agricultural Commissioner. Mr. Ramiah who had visited the station should also give his assistance.

The recommendations of the Committee were accepted by the Board.

ITEM No. 15 (a) (i).

Application from the Government of the Punjab for a grant of Rs. 11,070 spread over five years for a scheme for investigating problems of quality in fine rices in the Punjab. (Appendix XXVIII.)

The Rice Committee recommended the scheme for sanction. It also recommended that the quality of talc as a preservative may be tested in connection with this scheme.

At the Advisory Board Khan Bahadur Mian Afzal Husain pointed out that the research work on storage should be done in collaboration with an Entomologist. Mr. Stewart agreed to do this.

The Board endorsed the recommendation of the Committee.

ITEM No. 15 (a) (ii).

Note by the Rice Specialist, Sabour, on investigations of the factors which govern quality in fine rices and the possibility of growing such rices in tracts other than those to which they originally belong without any deterioration in their quality. (Appendix XXIX.)

The note was recorded both by the Standing Rice Committee and the Advisory Board.

ITEM No. 15 (b).

Scheme from the Government of Madras for a study of the rice-growing conditions and the botanical and chemical work on rice in more advanced countries. (Rs. 3,500 for six months.) (Appendix XXX.)

The Rice Committee recommended that the consideration of the scheme be postponed due to war conditions.

This was accepted by the Board.

ITEM No. 15 (c).

Application from the Government of Sind for a grant of Rs. 74,410 spread over 5 years for a scheme on manurial and agronomic work and water requirements of rice in Sind. (Appendix XXXI.)

The Rice Committee recommended that the agronomic and cultural part of the work on the scheme should be a provincial responsibility and in view of this reduction in the programme recommended provision of funds by the Council for three members of the staff, *i.e.*, one Agronomist, one Senior Assistant and one Graduate Assistant. The financial liability of the Council would then amount to Rs. 29,760 for five years. The question as to what amount of travelling allowance for the staff if any should be provided was left to be discussed along with the general question by the Advisory Board.

At the Advisory Board Dr. Burns said that the Rice Committee dealt with the Sind scheme on the principle that plant breeding work had already been largely done in Sind as in other provinces and that the subvention to be given by the Council should be confined to work on the irrigation and manurial side.

The question as to what amount of travelling allowance for the staff should be provided was left to be discussed along with the general question by the Advisory Board. The point for decision was whether the principle already laid down by the Council, *viz.*, that the Council should provide only the salary of the senior staff, should be interpreted as meaning that the pay of the staff should only be provided or that it included travelling allowance as well.

Rao Sahib Thadani said that he had nothing to say in view of the fact that the scheme had been recommended by the Rice Committee. He, however, pointed out that some amount should be provided for travelling allowance. Dr. S. K. Mitra said that the question of travelling allowance was really a difficult problem in all the provinces. For this reason the Assam Government could not depute their representative to attend the Rice Committee.

Dr. Hideyatullah said that the Bengal scheme which was similar to the Sind Scheme was recommended for a period of two years only whereas the Sind scheme was recommended for five years. Moreover, as the Rice Committee had decided that all the rice schemes should terminate at one and the same time, he suggested that the Sind scheme should also be recommended for 2 years. Dr. Mitra endorsed this view.

Mr. Allan said that the Bengal scheme was going on for several years whereas the Sind scheme was a new one and he did not understand how one could expect definite results within two years. Mr. Stewart remarked that it was not known whether the Governing Body would allot funds within two years.

The Chairman said that it was not necessary at present to consider whether the scheme should be recommended for two or five years, as the chances of new schemes being sanctioned before 1942 were very small at present, if the position changed later, the matter could be further looked into. The real point for discussion was whether provision for travelling allowance should be made for some of the staff or not.

Mr. Carpenter said that in dealing with the question of travelling allowance it was necessary to consider whether the programme of work to be carried out was entirely at one Agricultural Station. If so, there seemed to be no necessity for travelling allowance. But if the scheme was to be carried out at different places, obviously the Officer-in-Charge of the work would be required to travel from one part to another to examine the work. Therefore the question of providing travelling allowance entirely depended on the programme of the Scheme.

Dr. Mitra said that it cost about Rs. 800 for one representative from Assam to come to Simla and Delhi. In addition, the rice research worker had to go to several parts of the province to study the plants in different places.

Rao Sahib Thadani said that when considering this question two points should be taken into consideration. Firstly, the Officer-in-Charge of the scheme would have to travel from one station to another and also to certain parts of the province to collect material for his work and secondly, he will have to visit Simla or Delhi when the Rice Committee met to consider his scheme. It was therefore necessary that a sufficient amount to cover the expenses of these journeys should be provided.

Another point which Rao Sahib Thadani raised was that in this scheme cost had been calculated on actual pay, but the leave allowance should also be included.

The Chairman said that in so far as the travelling allowance was necessary for working the scheme, it should be recommended by the Board. But the question was whether the Council should provide the travelling allowance for the officers concerned to come to Simla and Delhi twice a year. If this was agreed to, it would mean a pretty big sum at least in the case of most of the provinces.

Rao Sahib Thadani said that the presence of an officer who had submitted a whole year's report would be worth while at the meeting if he came to explain his report.

The general opinion was that apart from provision required for general touring, travelling allowance should be provided for the visit of the Officer-in-Charge not more often than once a year to the meeting of the Advisory Board or its committee at which his report would be considered.

The Board adopted the report of the Rice Committee subject to suitable additional provision being made for travelling allowance and for leave salary.

ITEM No. 16 (*a*).

Further consideration of Sir John Russell's recommendation regarding diseases of rice.

The Rice Committee recommended that in order to get co-ordinated research started at the Centre to investigate the important diseases of rice, *e.g.*, Ufra, Leaf Spot, Foot-Rot, the Director, Imperial Agricultural Research Institute, should be approached with the suggestion that Dr. Padwick should take up the matter with the provinces. He should be requested to try and arrange a preliminary meeting during the course of the next two or three days with the Plant Pathologists and Economic

Botanists of the Provinces who had come in connection with the Advisory Board to discuss with them the details of a suitable scheme. Thereafter Dr. Padwick should take up the matter with provinces and arrange if necessary for a meeting between now and the next meeting of the Advisory Board of Plant Pathologists (or where there is no Plant Pathologist, Rice Botanists) of the rice-growing provinces with a view to put up a suitable scheme to the Advisory Board.

In the Advisory Board Rao Bahadur Viswanath said that the suggestion of the Rice Committee was that this matter should be further looked into by a special committee which was to be called by Dr. Padwick. His information was that Dr. Padwick had decided to call a meeting of the members of the Rice Committee who were present for the Board meeting to consider the matter further and to put up a note.

Mr. Rama Reddi said that this meeting had not been called because many of the members could not find time.

In reply to a query from the Chairman, Mr. Rama Reddi said that Dr. Padwick was intending to call a meeting of the special committee before the members left Delhi.

The Board agreed that the consideration of this matter should be deferred and the report of the special Sub-Committee should be awaited.

ITEM NO. 16 (*b*).

Use of talc for polishing and preserving purposes in the rice industry. (Appendix XXXII.)

The Rice Committee considered it inadvisable to take up the study of talc as a polishing agent but recommended that its quality as a preservative may be tested in connection with the Punjab scheme for investigating th e problems of quality in fine rices in the Punjab. [See also item 15 (*a*) (*i*)].

The Board agreed wth the recommendation of the Rice Committee.

ITEM NO. 16 (*c*).

Question of placing the standing Rice Committee on a permanent basis on the lines of the Indian Central Cotton Committee. (Appendix XXXIII.)

The Committee recommended that the Rice Committee should meet more often and should devote more attention to rice development and rice marketing and if this Committee was not in a position to do so on account of technical or financial difficulties, steps should be taken to establish instead a statutory committee on the lines of the Indian Central Cotton Committee.

The Board endorsed the recommendation of the Rice Committee.

ITEM NO. 16 (*d*).

Report of the Rice Committee on items not included in the Agenda of the Advisory Board.

(i) The Rice Committee recommended that the Agricultural Marketing Adviser should consult the trade interests concerned at Calcutta before making recommendations for the grading of *Patnai* rice.

The Advisory Board endorsed this recommendation.

(ii) *Removal of Stones (Kanker) and other foreign substances from paddy.*—The Rice Committee was of the opinion that it was primarily a local problem and that the attention of the Provincial Government should be drawn to it with the Committee's suggestion that propaganda should be undertaken among the cultivators to instruct them to avoid letting *kankar* get into the paddy and to attend to winnowing properly.

The above recommendation was accepted by the Advisory Board.

(iii) *Commercial rice and its qualities.*—(a) The Rice Committee considered that it was not feasible to take into consideration the nutritive value of rice for classifying it for commercial purposes.

(b) The question as to whether any other rice of type similar to Seeta (Patnai) rice can be grown in Bengal may be referred to the Provincial Department of Agriculture.

The Advisory Board endorsed the above recommendation.

(iv) *Reduction of Railway freight on paddy in relation to rice.*—The Rice Committee recommended that the Marketing Staff should explore the possibility of recommending the introduction of reduced rates of freight for paddy, particularly in areas where no mills exist, and that in arranging the special rates the interests of local cottage industries should be taken into account.

The above recommendation was endorsed by the Board.

(v) *The trade position and recent price-trends of rice.*—The paper was recorded.

(vi) *Economic disadvantages of Aman paddy lands.*—The Rice Committee recommended that a copy of the note should be sent to the Provincial Government for taking such action as they think fit, with the Committee's suggestion that they might explore the possibility of increasing the yield per acre on an economic basis by a suitable system of irrigation.

The Advisory Board endorsed the above recommendation.

(vii) *Consideration of the question relating to the uneconomic price of rice.*—The Rice Committee recommended that suitable steps should be taken to maintain the price of rice at a reasonable level and for this purpose the Government of India should be moved to consider the advisability of regulating the imports of rice. They further agreed that the question as to what should be regarded as a reasonable price should be further examined and a definite recommendation made before February, 1940.

The Advisory Board endorsed the above recommendation.

(viii) *The part played by different major factors in increasing the yield per acre of paddy and the extent to which such increased production could be expected, on economically sound lines, under Indian conditions (Bihar).*—The Committee recommended that to increase the outturn of rice the 'project' system should be tried to popularise the improved Agricultural practices and other improvements and suitable schemes may be prepared for the purpose. As to the form these schemes should take, that would be decided after the meeting of the Advisory Board in the light of the discussions that would take place.

(ix) *Description of crop plant characters and their ranges of variation—variability of rice by K. Ramiah and others. The need for modification (Assam).*—The Rice Committee accepted the observation of the Sub-Committee that there was no need to alter the schedule on which plant breeders were already working.

The Board endorsed the recommendation of the Committee.

(x) *Need for systematic work on the pre-treatment of seeds (Assam).*

(xi) *Research work on the production of mutants detailed studies on vernalisation, electro-culture, etc. (Sind).*—The recommendation of the Rice Committee was accepted that the matter might wait for the present as vernalisation was to be discussed at the next meeting of the Crops and Soils Wing.

(xii) *Note received from the Government of Sind regarding the Fine Pulao Rices.*—This is covered by item 5 (*a*).

(xiii) *Standardisation of hulling tests.*—The Rice Committee held that for the purpose of comparison of various rices throughout India it was desirable to adhere to the recommendation contained in the schedule already in use for describing the price varieties. This however should not interfere with any experiments, in the comparison of Apparatuses for carrying out hulling tests ; Mingetti and Megill machines were mentioned as giving results very close to those obtained in mills. These machines required electricity for their working. It was noted that Ci-co-oo rice sheller was not available but arrangements could be made to get the same made by the Agricultural Research Engineer, Coimbatore.

The Board endorsed the recommendation of the Committee.

(xiv) *Evolving some suitable cooking apparatus for carrying out cooking experiments (Orissa).*—At the Rice Committee Mr. Dixit (Orissa) exhibited an apparatus made out of bell metal for testing cooking qualities of different varieties. It was pointed out that the same principle had already been used and discussed in the investigation on the quality of rice carried out by the Agricultural Marketing Adviser in collaboration with Madras workers. It is described in the final report of that research, Appendix I, page 12, 1935-37. Mr. Dixit also showed a simpler apparatus for demonstrating to cultivators different cooking qualities of new rices.

The Board noted the report of the Rice Committee.

(xv) *Some problems in rice in the North-Konkan—Note by Mr. G. D. Vartak.*—At the Rice Committee it was pointed out that the Bombay Government had done a considerable amount of work on the control of crabs and it was desirable to try this out on a large scale. The Crop Botanist, Bombay, informed the Committee that the Director of Agriculture, Bombay, had submitted to the Bombay Government a scheme for work on rices of the North-Konkan and it was suggested that if the Bombay Government desired they might also put up a scheme on Salt rice which would be considered on its merits.

The Board endorsed the recommendation of the Committee.

(xvi) *Devising some apparatus to facilitate the process of emasculation and hybridisation in paddy (Orissa).*—Mr. Dixit exhibited the

apparatus for causing the flowers of paddy to open soon so as to make the remocal of unburst anthers easy. The Committee took note of this apparatus and discussed certain other methods which had been tried with varying success at other stations.

The Advisory Board noted the report.

(xvii) *Research on growing deep water paddy in Bihar and East United Provinces.*—At the Rice Committee it was considered that the Bihar Agricultural Department should take up the matter with the United Provinces Agricultural Department and come to some agreed plan before approaching the Imperial Council of Agricultural Research.

The Board accepted the recommendation of the Committee.

ITEM NO 17 (*a*).

Progress report of the oilseeds research scheme, Central Provinces and Berar.

The Botanical and Physiological Committee reported as follows :—

" Mr. Ramiah said that he was not able to follow what the author intended to do in order to get better types of linseed. From pages 5—8 of the report he goes on giving the number of plants studies, number of seeds per gram from individual plants, culture numbers but he might as well have given averages or standard error for each of those determinations.

Oil content.—It seems as if he is going to test the oil content of 500 selections. It is not necessary or feasible.

The author had said that he had observed 51 colours in the *til* selections. How did he propose to isolate them for study of genetics of these colours.

The author had said that the chief objects of the present investigation are to evolve strains free from phyllody. But was phyllody a genetical character at all ?

The printing of the report is also faulty.

With regard to oil percentages, he had determined 18 this year and the rest he will determine probably in later years. There is bound to be a seasonal variation. How will he compare the results of one year with another ?

Dr. Patel said it would be an advantage if the Oilseed Specialist, Central Provinces, visited some oilseeds research stations.

Dr. Pal said that he had gathered that one of the chief aims of the linseed breeding work was to obtain strains combining high yield and oil percentage and that as regards fibre production the idea was to obtain fibre merely as a by-product. In the programme of work on page 2 of the report, however, it was stated special attention would be paid to breeding a long-stalked strain without any tendency to branch. Non-branching strains were likely to give lower yields of seed. He suggested that this point might be given consideration by the officer in charge of the Scheme.

Professor Kumar said that the author was also doing the collection of the exotic varieties. He (Professor Kumar) had been carrying

linseed breeding work for the last six years. He had had several collections from America, Argentine, and Ireland. He found that germination of these was extremely poor and the plants if they survived were very weak and hardly produced anything. Repetition of the growing of exotic collections appeared to be a waste of time.

The Committee desired that the points raised above should be considered by the Officer-in-Charge. He should also get in touch with the other botanists and see the work at other oilseed research stations. He should also attend the meeting of the Oilseed Botanists proposed to be held at Nagpur shortly."

At the meeting of the Board Mr. McDougall said that so far as the Committee was aware only 18 samples had been analysed upto the date of the presentation of the report, but he knew that up-to-date some 70 or 80 samples had been analysed. The Provincial Government had sanctioned the appointment of an Assistant in the Chemical Section for the express purpose of dealing with these analyses and he was of the opinion that more samples would be analysed hereafter and the difficulty of seasonal variation would be avoided. The tendency on the part of the Oilseeds Specialist to deal with many samples would be curtailed and he would not be allowed to deal with more than 80 to 100 samples per year.

With regard to Dr. Pal's remarks that breeding for the strains which did not branch would lower the yield of the fibre, Mr. McDougall observed that considerable amount of work had been done and that the Committee should not commit itself to any opinion as to the types which are considered suitable for fibre. He said that the fibre part of the work was a minor one and substantial progress had been made on this work and this had attracted good deal of attention from the trade. He agreed entirely with the Committee's recommendation that the repetition of the growing of exotic varieties was unnecessary that the Oil-seed Specialist should be asked to curtail that part of the work. As regards the suggestion that the Oil-seed Specialist should visit other stations, Mr. McDougall said that he would visit Lyallpur shortly.

The Chairman suggested that the report of the Committee might be adopted except for the observations that breeding for the strains which did not branch would lower the yield of the fibre, as that statement required further elucidation.

The Board agreed to this proposal.

Item No. 17 (b).

Progress report of the sann hemp cultivation scheme, Bombay Province, for the year 1938-39.

The progress report was approved by the Botanical and Physiological Committee and the Advisory Board.

The Board accepted the suggestion of the Director of Agriculture, Bombay, that the scheme should be closed down at the end of the current year, *i.e.*, after the scheme had run for two years, as no definite results had been obtained and that the District Agricultural Overseer who was supervising the scheme would no longer be available for this work.

ITEM No. 17 (*c*).

Second annual report of the Central Provinces Sann hemp scheme for the year ending 31st March 1939.

The annual report was approved by the Botanical and Physiological Committee and the Advisory Board.

ITEM No. 17 (*d*).

Annual report on scheme for investigation into the attack on Jowar by the parasite 'Striga' for the year 1938-39.

The annual report which had already been discussed to some extent in the Jowar Committee was approved by the Botanical and Physiological Committee and the Advisory Board.

ITEM No. 17 (*e*).

Progress report on the scheme for research into systematic cultivation of Medicinal plants and the study of food poisons for the year 1938-39.

The progress report was approved by the Botanical and Physiological Committee and the Advisory Board.

ITEM No. 17 (*f*).

Report on the investigation into the matting and brewing qualities of Indian barleys. (Report of the Institute of Brewing—1937-38.)

The report was recorded by the Botanical and Physiological Committee and the Advisory Board.

ITEM No. 17 (*g*).

Annual report on scheme for co-operative experiments on Tobacco in Gujarat for the year 1938-39.

Report of the Co-operative flue-curing experiments on tobacco (Punjab), 1938-39.

Report on the co-operative experiments on the quality of cigarette tobacco conducted at Sabour Farm during 1938-39.

Progress report on the co-operative tobacco scheme for the year 1938-39 (Hyderabad).

Reports on the co-operative tobacco scheme (flue-curing experiments) for 1938-39 (from the Imperial Agricultural Research Institute, Central Provinces, Baroda and Burma).

The Botanical and Physiological Committee noted that the results were not comparable with one another. The reports were not considered individually. They will be considered together when the reports of all the stations are received. The Board noted the proceedings of the Committee.

ITEM No. 17 (*h*).

Annual Progress Report of the All-India caster improvement scheme, H. E. H. the Nizam's Government for the crop year 1937-38.

The Botanical and Physiological Committee observed that the programme was revised with the help of the Agricultural Commissioner and was under execution at present. The Committee and the Board approved the report.

ITEM No. 17 (*i*).

Report on the cultivation of Pyrethrum in India. (Appendix XXXIV.)

The Botanical and Physiological Committee noted that the experiments on the cultivation of pyrethrum have been successful in Kashmir and Kulu and Parachinar, but not particularly successful in Dehra Dun, Chaubattia and the Bombay Presidency. At Tarnab, there was a certain amount of success. At Balehonur, its success was doubtful. Kulu and Kashmir seemed to be the most suitable places for its cultivation on a large scale.

Colonel Covelle, Director of the Malarial Institute, who had specially come to explain how pyrethrum was used for the control of Malaria told the Committee that he had heard from the Forest Officer, Baramula, Kashmir that he had sufficient supply of viable seed of pyrethrum for cultivating 5,000 acres of land. He suggested that the cultivation of pyrathrum in India, particularly in Kashmir would be a profitable proposition. Dr. Burns informed members that if any of them wanted seeds from Kashmir he might arrange for the supply.

At the Advisory Board, Dr. Burns explained that he had a talk recently with the Director of Agriculture, Kashmir and understood from him that there was not sufficient supply in Kashmir and that something should be done to grow pyrethrum in British India.

The report was recorded.

ITEM No. 17 (*j*).

Report on the scheme of research on coconuts in the Madras Presidency for the year 1938-39.

The Botanical and Physiological Committee noted that this was the first report on the scheme and that no reliable information could be expected before the third year. The report was approved by the Committee and the Advisory Board.

ITEM No. 18 (*a*).

Technical programme of work at the Tobacco Research Sub-station, Guntur. (Appendix XXXV.)

The technical programme was approved by the Botanical and Physiological Committee.

At the Advisory Board Mr. P. H. Carpenter said that items 1 and 2 should be statistically examined to obtain full information on the subject. As regards item 1, the interaction of varieties and manure should be studied. As regards No. 4, he thought that the experiments should be replicated in the Guntur soil as otherwise one might be misled. He further suggested that the Statistician to the Council should be consulted in planning these experiments.

Dr. Burns said that there was bound to be a certain amount of difference of opinion regarding the ideal combination and further explained the technicalities of the scheme.

Rao Bahadur Viswanath said that the technical programme was prepared in consultation with the Statistician to the Council. The original idea was not to carry out manurial experiments but to test the

quality of tobacco. Later on at subsequent meetings of the Committee and the Board they decided that manurial experiments should be given prominence.

Rao Bahadur Vaidyanathan said that the question of lay-out was discussed with the Director of the Institute a year ago, when it was thought that the yield was not a material point in this experiment. But subsequently at the Simla Sub-Committee meeting it was felt that 'yields' should also be combined with 'quality' in this experiment. The Agricultural Commissioner and he went through the whole question again and suggested that the experiment should be completely modified. He had also made suggestions with regard to the best method of sampling for testing the quality. Under the circumstances, the best thing would be to treat this year's trial as purely preliminary, and on the basis of the data that would be available so to design the experiment as to combine all necessary factors.

Subject to the above remarks the technical programme was approved.

ITEM No. 18 (*b*).

Benares Hindu University Scheme on physiology of cane and wheat. (Report of special sub-committee.)

A special committee consisting of Dr. W. Burns (Chairman), and Mr. Boshi Sen, P. H. Carpenter, Dr. A. K. Mitra, Dr. R. D. Rege, Dr. B. N. Singh, Mr. H. R. Stewart, and Rao Bahadur M. Vaidyanathan considered this scheme.

The Committee while considering various items of the programme and the criticisms made by the Sub-Committee of the Sugar Committee at its meeting held in May 1939 in regard to experiments in pot culture noted the recommendation made by the Botanical Sub-Committee of the Advisory Board and accepted by the Advisory Board at its meeting held in January 1937, that the trials should be carried out in pots as is being done.

The Committee next considered the various experiments on sugarcane in the report for the year 1937-38 and made the following comments :—

A comparison of the yields between pots of the size 12″ × 9″ (Table IX) and 18″ × 12″ (Table X) indicated that the size of pots had a definite effect of their own besides other treatments on the growth of plants. Dr. Singh informed the Committee that this was due to the fact that the sanction for the grant was conveyed in June when the canes had already germinated in smaller pots in the absence of large size pots, in the experiments conducted during 1938-39 pots of a bigger size (18″ × 12″) had been employed. The number of pots, nature of the soil and statistical analysis were not given in many cases in the report. In his report Professor Singh has mentioned that the statistical analysis of the data was yet in progress and the results would be submitted along with the second year's report. The terminology such as bushes ; rows, etc., for individual plants was not that generally employed in sugarcane work. Some of the results for instance, greater growth with phosphorus than with nitrogen (Table IX) and higher percentage of sucrose with increased nitrogenous manuring (graph opposite page 32) were also

contrary to the normal results obtained in other sugarcane research stations. The inference is based on the averages of data for one year and we have to await further data and their statistical analysis. The design of experiment of combination of different manures, in (Table X, page 24 was defective as it was very difficult to obtain interaction of various factors in the proposed manner. Professor Singh pointed out that since the work was conducted in pots with single doses of manures or in combination thereof the statistical analysis has now been done along correct lines by Professor Mahalanobis who had originally given the design of the different experiments. Use of Pavvy's method for sucrose analysis was discussed and it was observed that where high accuracy was not required any method could be used.

The Committee recommended that the Agricultural Commissioner should visit the stations to examine the working of the scheme on the spot.

The recommendations of the Committee were accepted by the Board.

ITEM No. 18 (*c*).

Technical programme of work under the scheme of research on pan cultivation in the Central Provinces and Berar. (Appendix XXXVI.)

At the Botanical and Physiological Committee, Dr. Hidayatullah suggested that Kurol treatment of the soil should be tried for the control of foot-rot and anthracnose diseases but Doctors, Uppal and Dastur said that their experience was that this was not helpful. Dr. Uppal found soil drainage effective for this purpose. Dr. Dastur said he would bear this in mind, but pointed out its difficulty in the conditions prevailing in the Central Provinces where the *pan* beds are under chest-deep water during the rains.

Subject to the above remarks the technical programme was approved.

ITEM No. 18 (*d*).

Technical programme of work on the scheme of research for wheat breeding for the black soil areas. (Appendix XXXVII.)

As recommended by the Botanical and Physiological Committee, the technical programme was approved with the proviso that intervarietal crosses should be cut out of the programme, as there is no provision for a glass house there for the study of physiological races. Seeds should be sent to Dr. Uppal for carrying out seedling resistance and adult plant resistence tests at Mahableshwar. The collection of physiologic races was the work for Dr. Mehta.

ITEM No. 19 (*a*).

Proposal for the extension of the Patato Breeding Scheme for Northern India at a cost of Rs. 84,000 (round) spread over five years. (Appendix XXXVIII.)

The Botanical and Physiological Committee recommended that the scheme be extended for a period of five years with effect from 1st April 1940 at a cost of Rs. 84,000 to the Council spread over a period of five

years, inclusive of a non-recurring grant of Rs. 9,200. It desired that although it may not be feasible now, the question of sending the Superintendent to Cambridge for a short period should be kept in mind, as Cambridge offers the best facilities for the study of material obtained by the Empire Patato Expedition.

The new items of expenditure including contribution from the Contributory Provident Fund were approved. On the latter question it was recognised that it would depend on the decision arrived at by the Council on the general question of instituting a Provident Fund for the staff employed on the Council's schemes.

As for the establishment of an intermediate station for multiplying promising varieties or for conducting varietal trials, the Committee decided not to record any opinion until a definite scheme was submitted.

At the meeting of the Board, with regard to the Committee's observation that it could not record any opinion until a definite scheme had been submitted, Rao Bahadur Viswanath asked if the Council approved in principle the question of multiplying varieties of potato and carrying on varietal trials. If the Council approved of this and gave directions to that effect, then he would prepare and submit a suitable scheme ; otherwise it was a waste of labour to submit such a scheme. When the original scheme was drawn up it was not anticipated that there would be material available for varietal trials or for multiplication. Now after 5 years of experimentation, some material had been collected for trial and multiplication for which an intermediate station at a lower altitude, was necessary. If, however, the Council did not approve, in principle the multiplication of promising varieties and varietal trials, there was no use submitting a scheme.

The Chairman asked if there was any objection on principle to having an Intermediate Station. Dr. Burns replied that the Council should not commit itself in advance about a scheme the estimated cost and scope of which was not known. Dr. Burns added that a site for the intermediate station had not yet been selected, but it was believed that a place such as Jeolikote in the Naini Tal foothills would be suitable. The estimates of cost of land, etc., could not be given with any definiteness pending the selection of a suitable site. The Director, Imperial Agricultural Research Institute had said that as finding a suitable site means visiting a number of places in the lower hills and consequent expenditure of time and money, the approval of the Council to the principle of having an intermediate station was sought in the first instance. Definite estimates could then be submitted in about a year's time. How could the Council, said Dr. Burns, agree to commit itself to a scheme about which there was no definite information. It was entirely contrary to the ordinary procedure of the Council to approve in principle an expenditure without knowing what that expenditure was going to be.

Rao Bahadur Viswanath said that what he wanted to know was if the Council considered it desirable that multiplication and preliminary varietal trials should be done or not. If the Council approved of the principle ; then the Imperial Economic Botanist would go round and select a site and submit a scheme. In the meantime, during 1940-41,

it was proposed to lease a few acres of land near the Potato Station at Simla for multiplication and preliminary varietal trials. This was being provided for as non-recurring expenditure under the main Sub-Station.

Mr. Allan said that it was the declaration of policy that was required and not any financial sanction.

Rao Sahib Thadani suggested that the potato growing provinces should be consulted whether they could not arrange for the testing of these improved types of potatoes evolved at the Simla Sub-station. He was sure that the Provinces who were growing potatoes would gladly take up this work at no cost to the Council. On principle, any research carried out at the centre should be passed on to Provinces for further trials. The centre did not maintain sub-stations. It might therefore be taken for granted that the Provinces would be agreeable to take up further trials proposed if material was sent from the Simla Sub-Station.

Mr. Nizamuddin Hyder asked if the Economic Botanist had got enough material for passing it on to Provinces.

Rao Bahadur Viswanatha said that he was quite willing to send out whatever material the Economic Botanist might have but the material might not be much. Owing to the limited land available at the Simla Sub-station, sufficient material could not be propagated. Rao Sahib Thadani felt that that meant that the station required extension for further multiplication work.

The Chairman asked if it was possible to do that part of work at Simla by extending the site of the station. Mr. Stewart informed Rao Bahadur Viswanath that there was a piece of land near the Simla Sub-Station, belonging to the Government of India which might be available for the purpose.

In reply to Mr. Stewart, Mr. Viswanath said it was not that he was asking.

Mr. Allan said that the Botanist in charge of this work had reached a stage when he was in a position to send out 3 or 4 varieties for trial. The varieties were meant for growing in the plains. Hence it was necessary to multiply them and conduct varietal trials at lower altitude than at Simla. It was not certain whether Simla would be the best place for doing intensive cultivation of potatoes.

Mr. Rama Reddi said that as a matter of fact the Council on principle should not finance this scheme at all. The Simla Sub-Station was more or less a permanent station under the Government of India in the same manner as was the Coimbatore Sugarcane Station. He suggested that the Government of India should finance the sub-station completely and the Board should make a similar recommendation as it did in the case of Pusa Sub-Station, *viz.*, to extend the scheme only for a short period and in the meantime to ask the Government of India to take over the station permanently. The Chairman said that the first point that had been raised by Mr. Rama Reddy was whether the Council should sanction the extension at all. And if the Government of India did not take over this station was it the intention of the Board that it should be closed down.

Rao Bahadur Viswanath said that this was not a scheme for which the initiative was from the Imperial Agricultural Research Institute. That was put up at the request of the Imperial Council of Agricultural Research. He said that Imperial Agricultural Research Institute could submit schemes to the council and it was for the council to accept or reject. There was the right and it would continue to remain. If the Council now was not going to extend this scheme it was very doubtful whether the Government of India would be prepared to finance and continue the station, as part of the main Institute.

The Chairman pointed out that in any case some extension must be sanctioned until the Government of India were approached and their reply was received.

Mr. Rama Reddy suggested that the scheme be extended for a period of one year.

Rao Bahadur Viswanath pointed out that if the scheme was recommendaed for one year's extension, the Council would find itself in the same position at the end of that period. If it was the intention to approach the Government of India to find out if they would be prepared to take over the staff and station, then the scheme should be recommended for two years' extension.

Mr. Allan strongly opposed the amendment proposed by Mr. Rama Reddy and said that the scheme was started by the Council and being so successful it should be extended for a full period of five years as recommended by the Committee.

Dr. Burns agreed with the views expressed by Mr. Allan and further said that by approaching the Government of India for taking over this station by making this a parallel case with the Pusa Station they would be weakening the argument regarding that as well. As had been pointed out already this scheme was submitted for carrying out a definite piece of research at the instance of the Council and therefore it should not be classified as an ordinary sub-station of the Institute. He suggested that they should stick to the recommendation of the Committee.

Rao Bahadur Viswanath said that if the scheme was considered useful and deserved extension on its merits, would it be right to raise such a question at all ? In the case of a new scheme one could say any thing but here was a scheme which had proved its worth by its work of a fundamental character and it would not be fair to turn it down or to extend it for an insufficient period.

The Chairman suggested that the situation might perhaps be met if the Government of India were approached with a request that this important work which had been financed by the Council and which had shown excellent results should now be taken by them on a permanent basis. The same had been done in the case of one or two other matters, such as the Locust Research scheme.

Dr. Burns proposed that the recommendation of the Committee be accepted. Rao Bahadur Viswanath seconded it. Mr. Rama Reddy said that the extension be given for a period of two years and the Government of India should be approached to take over the Sub-station at the end of this period.

The amendment proposed by Mr. Rama Reddy was, put to vote and was lost. The recommendation of the Committee was accepted and the Board recommended the scheme for five years' extension.

The idea of establishing an intermediate station for multiplying promising varieties and for conducting varietal trials, was dropped.

ITEM No. 19 (*b*).

Proposal for the renewal of the scheme for research into the systematic cultivation of medicinal plants and the study of food poisons under Colonel Chopra for a further period of 3 years at an additional cost of Rs. 26,305. (Appendix XXXIX.)

The Botanical and Physiological Committee recommended that the scheme be extended for a further period of three years with effect from 1st April 1940 at a cost to the Council of Rs. 32,305. It was noted that out of this amount Rs. 6,000 would be met from savings of previous grants for this scheme, so that the net additional cost to the Council would be Rs. 26,305. It was assumed that the increment of Rs. 25 allowd to the Botanist and Assistant Botanists was biennial and not annual.

An extension for a period of three years with effect from 1st April 1940 at a cost of Rs. 32,305 to the Council, was recommended by the Board.

ITEM No. 19 (*c*).

Proposal for the extension of the sunn-hemp scheme, Madras, for a period of three years at a cost of Rs. 1,500. (Appendix XL.)

At the Botanical and Physiological Committee Mr. Ramdhan Singh raised the question as how it was proposed to get pure varieties of sunn-hemp for varietal tests. It was now known that sunn-hemp plant in its pollination behaved just like maize and pollination was done by bees. Dr. Burns told him that all this was taken into account when the scheme was sanctioned and the intention was that varieties should not be taken from the same plot but would be imported from different centres and that experiments would be done by most careful method of artificial pollination.

The Committee recommended that the scheme be extended for about 2 years at a cost to the Council of Rs. 1,000 so as to terminate it on 31st March 1942. The Central Provinces Scheme, the most important of all the three sunn-hemp schemes financed by the Council terminates about that time. An extension for about 2 years at a cost to the Council of Rs. 1,000 was recommended by the Advisory Board.

ITEM No. 19 (*d*).

Scheme for the extension of the Botanical Sub-station at Pusa for a period of five years from the 1st October 1940 at a cost of Rs. 1,63,260. (Appendix XLI.)

The general feeling of the Committee was that this was not a scheme of research in the strict sense of the term but was a question

of subsidising a section of the Imperial Agricultural Research Institute, and that the financing of it must, following the recommendation of Sir John Russell, be treated as a permanent part of the Institute at the earliest possible date. The Committee recorded its opinion that while the Council may provide funds for a definite scheme of research, it should in no circumstance agree to financing an entire agricultural station such as this. As however, it was late in the year to suggest that the Government of India should take it over with effect from the termination of its present sanctioned period, *i.e.*, October 1940, the Committee recommended that the scheme be extended on the existing basis till 31st March 1941, after which the Council should take no responsibility for the continuance of the station.

Rao Bahadur Viswanath in tracing the history of this Sub-station said that if the intention was to discontinue the grant from the Council after the present extension which would expire on the 31st March 1941, he would strongly urge that it might be extended for a period of two years.

The recommendation of the Committee to extend the Sub-station on the existing basis till 31st March 1941, was accepted by the Board.

ITEM No. 19 (*e*).

Application from Rai Bahadur Dr. K. C. Mehta for a grant of Rs. 58,314 spread over three years for the continuance of investigations on cereal rusts in India. (Appendix XLII.)

At the Botanical and Physiological Committee it was observed that this scheme had been revised by Dr. Mehta in consultation with the Vice-Chairman, Imperial Council of Agricultural Research, after studying the alternative scheme suggested by the Agricultural Commissioner. (A copy of his revised scheme is attached.)

The revised proposals are estimated to cost Rs. 41,564. Dr. Mehta, however, asked for a further grant of Rs. 1,320 for completion of the comparative study of the morphology of the *Berberis* leaf. The total grant asked for the extended period therefore amounted to Rs. 42,864, against the original estimates of Rs. 58,314. The Committee discussed at great length the revised proposals of Dr. Mehta. The discussions revealed some sharp difference of opinion. The minority expressed the opinion that little research work remained to be done, the programme of work during the extended period being mostly of routine character, and the stage had therefore been reached when the work might be conveniently decentralised with a view to terminate it as soon as possible. The majority, however, favoured the view that it was difficult to distinguish between research proper and the so-called routine work in actual research and that on the whole it would be both advantageous to the Council and fair to Dr. Mehta if his collaboration was retained so long as the scheme was financed by the Council. As the general consensus of opinion was in favour of recommending the extension of the scheme on the basis of Dr. Mehta's revised proposals, the Committee recommended it at a cost to the Council of Rs. 42,864 for the period of 3 years from 1st April 1940 to 31st March 1943.

The Advisory Board approved the recommendations of the Committee.

ITEM NO. 20 (*a*).

Application from the Government of the United Provinces for a grant of Rs. 15,300 spread over three years for research work on the changes of crops and crop rotation in relation to nutrition by Dr. Radhakamal Mukherjee. (Appendix XLIII.)

The Botanical and Physiological Committee thought that it was a good scheme but it lacked details without which it could not be properly considered. The Committee, therefore, recommended that it be referred back with the suggestion that it should be resubmitted with the following details :—

(a) Details of items on which information will be collected.

(b) Number of villages, families, individuals proposed to be surveyed in each district.

(c) Details of analysis in the Physiological Laboratory.

(d) Scheme of statistical analysis with an explanation of how this is proposed to be done, as no staff is provided for this purpose.

The Board accepted the recommendation of the Committee.

ITEM NO. 20 (*b*).

Application from the Government of the United Provinces for a grant of Rs. 82,810 spread over five years for a scheme of research on perfume yielding plants by Dr. B. N. Singh and Rai Sahib J. N. Rakshit. (Appendix XLIV).

At the Botanical and Physiological Committee Dr. Krishna pointed out that this was not an agricultural problem, but a sylvicultural one.

The point whether Ghazipur, where Rai Sahib Rakshit had his own garden, was at all a suitable place for the cultivation of such grasses or perfume-yielding plants should be considered, because the results obtained at Ghazipur or Benares may not be applicable to the rest of the country. Mr. Stewart pointed out that the cultivation of Rosha grass in the Punjab had not proved so profitable as was anticipated originally, and he was doubtful if cultivation of such grasses was going to add greatly to the income of the cultivators. Dr. Sabnis expressed surprise that there was no reference in the scheme to the work which had already been done at the Harcourt Butler Technological Institute, Cawnpore.

After discussion, the Committee recommended that the scheme be referred back to the authors for redrafting in consultation with the Harcourt Butler Technological Institute, where they had got a fully equipped laboratory and had got some definite results on the subject fo perfumes and essence oils, giving more details about the plants which they actually wish to grow. The present list appeared to the Committee to be wholly unsatisfactory from the point of view of their worth.

At the Advisory Board Mr. Allan said that there were many other more deserving objects on which money could be well spent. The results of the proposed study would not affect 1|100,000th of the total agricultural population. He was of the opinion that this scheme should not be approved.

Mr. Stewart pointed out that when the Punjab Government granted land for the purpose of growing Rosha grass 15 years ago, Rosha grass oil was selling at Rs. 10 to 12 a lb., the price now was Rs. 2 per lb.

Mr. Mason pointed out that India imported Rs. 24 lakhs worth of perfumed essential oils and exported slightly more. In view of this substantial export trade the Board should consider whether it was advisable to finance this Scheme. He was of the opinion that the schemes should be referred back for reconsideration.

The recommendations of the Committee were accepted.

ITEM NO. 20 (*c*).

Application from the Government of the United Provinces for a grant of Rs. 34,334 spread over five years for a scheme for the breeding of rust resistant wheats and barley for the plains. (Appendix XLV.)

At the Botanical and Physiological Committee the majority was of the opinion that the investigations proposed in the scheme were primarily a local problem and the scheme was more or less an extension of the normal work which the local Department of Agriculture had been doing for the last 30 years. Moreover, the results likely to be obtained from the work were not likely to be of much use to the Punjab which is the premier wheat-growing province in India. The scheme was further criticised as scrappy ; it did not follow the first principles of reciting in some detail what had been done before, the position that had been reached and what was required to be done in future. The Committee by a majority, recommended that the scheme should not be recommended for sanction.

The Board accepted the recommendation of the Committee.

ITEM NO. 20 (*d*).

Application from the Government of Sind for a grant of Rs. 75,000 spread over five years for a scheme of research on pulses. (Appendix XLVI.)

The Botanical and Physiological Committee recommended the scheme subject to the following reductions being made in the budget estimates :—

1. The capital expenditure should be cut out completely.
2. The staff proposed should be reduced by one graduate assistant.
3. Contingencies should be reduced from Rs. 5,000 to Rs. 3,000 per annum.
4. Travelling Allowance—Only Rs. 1,000 should be provided for the first and Rs. 500 each for subsequent years.
5. The Provincial Government should contribute 50 per cent. of the total estimated cost, as revised above.

At the Advisory Board the Chairman remarked that the Committee's recommendations brought down the cost to Rs. 28,930, spread over five years. There is also another scheme on pulses from Bombay [item No. 20 (*j*)] which was also recommended for sanction at a cost of Rs. 45,500 for five years, half of which would be provided by the Provincial Government. His own impression was that there was a danger of overlapping of work

if individual schemes were sanctioned without looking at them as a whole and that it might be better to postpone these and study the whole subject in a special Pulse Committee and draw up a co-ordinated programme of work which could be put into effect in the provinces.

Mr. Allan supported this view.

Rao Sahib Thadani said that in the case of Sind Sir John Russell had recommended that this crop should be included in the rotation scheme as early as possible and urged that it should not be postponed.

Dr. S. K. Mitra said that this scheme was not dealing with a single crop but a group of crops and he did not understand how work can be done under this scheme from a breeding point of view as well as for multiplication of seeds.

Dr. Burns said that the Council itself had invited schemes on pulses. The schemes so far received had been practically straight plant-breeding schemes with the exception of the Sind Scheme which attempted to do a *certain amount of economic work. The chances of the pulse schemes* would not be spoiled if the question was considered as a whole in the way the Board considered the *Jowar* schemes.

The Chairman said that a small Pulses Committee would be appointed as quickly as possible on the lines of the *Jowar* Committee and that Committee would chalk out the complete plant of work in respect of pulses and the Sind scheme might further be examined in the light of the recommendations of that sub-committee.

Mr. Allan said that pulses in their actual cultivation were very closely associated with the cultivation of crops like jowar. Pulses were very often mixed with jowar and their general economic work was closely connected with other crops when they were combined.

Rao Sahib Thadani suggested that this scheme be adopted in principle subject to any modification of the programme of work considered necessary in the light of the recommendations that would be made by the proposed *Pulses Committee.* He also pointed out that in the Sind scheme the leave allowance for the staff had not been included due to an oversight.

The Board provisionally approved of this scheme, as modified by the Botany and Physiological Committee, subject to any further modification that might be considered necessary in the light of the recommendations made by the proposed Pulses Committee.

ITEM NO. 20 (*e*).

Application from the Government of Sind for a grant of Rs. 21,700 spread over five years for a scheme of seed production of high yielding strains of berseem crop in Sind and the maintenance of nucleus of pedigree seed. (Appendix XLVII.)

The Botanical and Physiological Committee observed that berseem seed was being grown very successfully in Karnal and several other places in the Punjab and suggested that the Sind Government should send one of their men to study the problem in the Punjab rather than start a new

scheme. Dr. Pal said that the technical causes of non-setting in Berseem seed were being studied already by him. The Committee recommended that the scheme should not be sanctioned.

The Board accepted the recommendation of the Committee.

ITEM No. 20 (*f*).

Scheme for investigation into the prospects of increasing cinchona cultivation in India. (Appendix XLVIII.)

The Botanical and Physiological Committee approved of the scheme and recommended that the programme of work detailed therein should be taken up with the least possible delay as its urgency has been increased by war conditions and in any event it will take at least 7 years after favourable results have been obtained from test plots before any practical results of value can be expected. It was also agreed that test plots should be widely distributed and the budget estimates require further detailed consideration.

At the Advisory Board meeting, Dr. Burns expressed the hope that members had had time to look at the scheme, put up by Mr. S. C. Sen. This was an admirable summary of the history of the case and embodied Mr. Wilson's recommendations with suggestions as to how they could be carried out in a satisfactory manner. He added that there might be certain details in the budget estimates that might have to be altered to suit local conditions, but as regards the scheme, the Committee considered that these were the lines on which work should be carried on. The urgency and necessity for producing more quinine in India was apparent. He, therefore, strongly urged that whole-hearted support should be given to the scheme and the Government of India approached to get on with the work.

Lt.-Col. Cotter said that it would take a long time to show any practical results in the way of increased output ; secondly, there is a chance of supplies of quinine from overseas being reduced owing to war conditions. Both these arguments suggested the necessity for starting this scheme urgently, and it should be pushed forward.

The Chairman, in summing up, said that everybody agreed that the Council should push forward this scheme as expeditiously as possible. He suggested that a rider should be added to the recommendation, asking for a special grant from the Central Government because the sum involved was well over 9 lakhs of rupees, and it was quite impossible for this Council to finance such a scheme. The other point that he wanted to mention was that he had not the slightest doubt that from the scientific and theoretical point of view the work should be carried out along the lines laid down but he would like the experts to consider whether it was not possible to get quicker practical results so that the actual requirements could be met at an earlier date. Was it not possible to decrease the research for the time being and push ahead the practical work by which more quinine could be supplied earlier.

Mr. Sen said that Dr. Burns had put the minimum period, in which the production could be appreciably increased, at 10 years. That was not because of the fact that they would have to wait for the results of

research, but was on the assumption that the actual cultivation work would be pushed on as quickly as possible, depending on the knowledge already available. The reason was that Cinchona was a long-period crop and we have to wait for 7 years after plantation for the fruit and harvest. A very small harvest was obtained from pruning and removal of the dead and dying plants in the intermediate period, but the whole plantation was not ready for cropping until about the 7th or 8th year. This was one practical limitation. The other limitation was that if the yield was to be increased, its acreage would have to be extended. Mr. Wilson has estimated an extension of acreage by 37,000 acres to make India self-sufficient in the matter of quinine—Cinchona is a sensitive plant which flourishes where the peculiar soil conditions and climatic functions are favourable to its growth. Areas will have to be selected which are not only suitable for its cultivation but which provide economic units for its plantation on a commercial scale. All this requires a preliminary survey in some detail of the tracts suitable for the purpose, if we are not to repeat the mistakes of the past which have hampered its expansion in India in the past. The progress of work would also depend on the co-operation of the provincial authorities and private people who owned the land but, as already pointed out even if the work was started under favourable conditions, we would have to wait for seven years before the scheme would yield any appreciable results. Further he said that research was also necessary to increase the yield per acre. Java obtained a yield of 600 lbs. per acre per annum, but the maximum yet obtained in India, taking it on an average over the whole area cultivated, was 250 lbs. per acre per annum. Occasionally, of course, a yield of 300 lbs. and in a very few cases even 500 to 550 lbs. had been obtained. That showed that it was at least possible to increase the yield per acre by careful methods of cultivation and that was where the research proposed by him would materially help. It was necessary to think of increasing areas and also increasing the yield per acre, and actual work on an industrial scale must proceed side by side with research on the more detailed aspects of cultivation.

The Board recommended that the scheme should be sanctioned subject to the observations made by the Botany and Physiological Committee and that it should be pushed forward with the utmost expedition, but as it involved a very heavy cost beyond the resources of the Council, the Government of India should be moved to provide a special grant for financing it.

Mr. Sprott suggested that this Council should recommend to the Central Government to guarantee a minimum price which would have a very great effect in encouraging private enterprise.

The Chairman said that this was a very useful and important suggestion but it would require further examination. The matter may be put up for consideration at the next meeting of the Advisory Board with a brief note on the subject.

ITEM No. 20 (*g*).

Application from the United Planters' Association of Southern India for a grant of Rs. 26,380 spread over 3 years and 3 months for a scheme of research on cardamoms. (**Appendix XLIX.**)

ITEM No. 20 (*k*).

Application from the Government of Travancore for a grant of Rs. 10,572 spread over 3 years for a scheme of investigation of the two major pests of cardamoms in Travancore. (Appendix L.)

These two items were referred to an *ad hoc* Cardamoms Sub-Committee, composed of—

Dr. W. Burns (Chairman).

Mr. P. H. Carpenter.

Mr. H. C. Javaraya.

Mr. K. R. Narayana Iyer.

Dr. H. S. Pruthi.

Mr. P. H. Rama Reddi.

Diwan Bahadur T. Raghaviah.

Mr. J. H. Sprott.

Dr. B. N. Uppal.

Rao Bahadur B. Viswanath.

The Sub-Committee reported as follows :—

"The Sub-Committee had before it an application from the United Planters' Association, South India, for a scheme of Rs. 22,380 for a research on Cardamoms plus an amount of Rs. 4,000 for a preliminary survey, also a scheme from the Travancore Government for a grant of Rs. 10,572 spread over three years and for the major insect pests of cardamoms. The United Planters' of South India's scheme had special reference to the so called "Marble" disease of cardamoms. The Sub-Committee also took cognisance of the fact that the Director of Agriculture, Madras had prepared a scheme, of which the Madras Government had sent an advance copy to the Imperial Council of Agricultural Research but as this had not yet had the consideration of the Madras Government, it was not officially before the Sub-Committee. The Sub-Committee after considerable discussion, came to the conclusion that suitable co-ordinated work on cardamoms in South India could not be done without the preliminary survey suggested by the United Planters Association and therefore recommend that this preliminary survey at a cost of Rs. 4,000 be undertaken as soon as possible and that the sanction of the Governing Body be obtained if necessary, by circulation and that priority may be obtained for this survey. It is anticipated that the report of the survey should be available for the consideration of the Advisory Board not later than a year hence. The officer conducting the survey should have as one of its terms of reference the outlining of a scheme for co-ordinated research which should include a central station and sub-centres in important cardamom areas."

At the Advisory Board Mr. K. R. Narayana Iyer said that cardamom is a crop of very great economic importance in South India and the total area under this crop was about 65,000 acres, which included nearly 52,000 acres in Travancore. The scheme put up by the United Planters Association of Southern India was essentially a survey of the mosaic disease. The mosaic disease was prevalent in Travancore and it was found by experience that this pest could be controlled by raising healthy seedlings from seeds rather than by the propagation of suckers. The extent of the damage

caused by Thrips and the Hairy caterpillar during the past 3 or 4 years was 50 to 60 per cent. Many of the members of the United Planters Association of Southern India had requested him to support the scheme for the control of these two pests. While agreeing with the recommendation of the Committee that a survey should be made, Mr. Narayana Iyer stressed the importance of carrying out work on Thrips and Hairy caterpillars at an early date and requested the Board to approve of the small scheme put up by the Travancore Government in that connection.

Dewan Bahadur T. Raghaviah said that there was a great deal of haziness about the location and the areas of cardamom cultivation and it was very important that a survey of the cardamom fields and the various diseases and pests should be undertaken first.

Khan Bahadur Afzal Husain said that this was a very important scheme and should be considered on its merits.

Mr. Rama Reddi said that the sub-committee considered three schemes on cardamoms, two were received officially and one was received unofficially. One of the schemes was put up by the United Planters' Association of Southern India for the investigation of the "Marhle" disease and the second one was for Thrips. The Third scheme put up by the Madras Government pertained to the investigation in diseases including "Marble" disease. The Madras scheme had not yet come up officially and it would be ready for the next meeting of the Adv sory Board when all the three schemes could be considered together. This would enable a decision to be taken with regard to the location of the central station and the sub-stations.

Mr. Sprott supported the findings of the sub-committee and said that the contemplated survey would bring out very useful information. He supported the idea that no scheme should be accepted until the survey was over.

Mr. Narayana Iyer again appealed to the Board to recommend the Travancore scheme in view of the fact that that State contained the largest area under cardamom and, that something should be done urgently to control Thrips and Hairy caterpillar.

Dr. Burns said that all the points mentioned by Mr. Narayana Iyer were taken into consideration in the sub-committee. Thrips was not a new disease and considerable amount of experimentation had already been done in collaboration with the Director of Agriculture in controlling thrips by spraying. The problem in connection with cardamom was a bit difficult in view of the fact that it was grown in inaccessible places, *i.e.*, forests and was also grown as a plantation crop. A certain amount of work had been done at the Coffee Research Station at Balehonur. It was therefore necessary that the knowledge hitherto obtained on cardamom problems should be collected and a preliminary survey had therefore been suggested.

The Chairman said that this suggestion should meet the situation because in any case funds were not likely to be available for big schemes for quite an appreciable time. The proposed survey could, however be undertaken straightaway, if the Governing Body agreed, and a complete scheme, which would be submitted by the special officer, could be considered at the next meeting of the Advisory Board.

Mr. Hidayatullah suggested that suitable areas in Bengal should also be included for survey. Dr. Burns said that cardamom grown in the Darjeeling district was of a special variety and that in any case he could not support the proposal to increase the scope and cost of this work until a survey in the compact area in the South has been first completed.

The recommendation of the Sub-Committee was accepted by the Board.

ITEM No. 20 (*i*).

Application from the Government of Sind for a grant of Rs. 33,600 spread over five years for a scheme of research on bidi tobacco. (Appendix LI.)

In view of the fact that so far work on tobacco had been concentrated mainly on the cigarette type and that at the last meeting of the Tobacco Committee the general feeling was that more work should be done on the other types of tobacco, the Botanical and Physiological Committee recommended the scheme for sanction, subject to 50 per cent. of the cost being met by the Provincial Government.

At the Advisory Board meeting it was decided to include the leave salary of the staff in the estimated cost, and with this addition, the scheme was recommeuded for sanction on a 50 : 50 basis.

ITEM No. 20 (*j*).

Application from the Government of Bombay for a grant of Rs. 41,360 spread over five years for a scheme of research on the improvement of the pulse crop in Bombay. (Appendix LII.)

The Botanical and Physiological Committee recommended the scheme for sanction, with the addition of one more assistant on Rs. 60—70—5—100 to carry out tests on wilt resistance at Poona where the facilities of a glass house are available. This will increase the estimated cost of the scheme by Rs. 4,140 to 45,500 over five years, half of which will be met by the Provincial Government.

The Advisory Board decided that this scheme should be treated in the same way as the Sind scheme. This scheme was approved in principle subject to any modifications that might be considered necessary in the light of the recommendations made by the proposed Pulses Committee.

ITEM No. 21.

FODDER AND GRAZING.

Schemes on mixed farming from

(*i*) *The United Provinces.*

(*ii*) *The North-West Frontier Province.*

(*iii*) *Orissa.*

(*iv*) *Sind.* (Appendix LIII.)

The several mixed farming schemes referred to the Fodder and Grazing Committee were examined together. The Directors of Agriculture of the provinces concerned explained the nature of their schemes.

Dr. Burns while explaining the genesis of these schemes informed the Committee that these were submitted on the invitation of the Council, Mr. Bruen held that mixed farming along the lines mentioned in the schemes was already carried on by a large number of farmers and said that what was actually required in mixed farming was a comprehensive project by which the number of milch animals maintained on a farm or holding should be progressively increased. Sir Datar Singh said that these schemes should be so designed as to find occupation for the cultivator during his leisure hours. Mr. Ware said that the schemes submitted took into account only one aspect of mixed farming, *i.e.*, the introduction of milch animals. Mixed farming should also include sheep breeding, poultry rearing, etc. Mr. Mazumdar said that no information whatsoever was available on the economic aspect of mixed farming and it was very important that something should be done to obtain some data to convince cultivators of the utility of mixed farming. It was also pointed out that mixed farming included the determination of the best method of utilisation of the available land and the rotation to be adopted and experiments to determine these were necessary before recommendations could confidently be made to cultivators. It was further suggested that the best area to take up will be the average size of a holding in a particular tract and wherever possible the work should be carried out on the holding of a cultivator by the cultivator himself. The Committee decided that it was necessary to standardise the schemes in the first instance and to revise them in the light of the suggestions made and for that purpose a small Sub-Committee consisting of representatives of the four provinces which had submitted schemes and a few other members of the Committee, namely Messrs. Allan, Bruen and Sir Datar Singh should draw up a standard scheme which could be applied throughout India with modifications to suit local conditions.

The Sub-Committee which consisted of the following members—

1. The Commissioner of Agriculture, Baroda,
2. Sardar Bahadur Sir Datar Singh,
3. The Director of Agriculture, United Provinces.
4. The Director of Agriculture, Sind,
5. The Director of Development, Orissa,
6. The Agricultural Officer, North-West Frontier Province,
7. The Deputy Director of Agriculture, Western Circle, Central Provinces,

reported as follows :—

The schemes under reference were from the United Provinces of the estimated cost of Rs. 261,213, Sind at Rs. 125,000, the North-West Frontier Province Rs. 9,996 and Orissa Rs. 8,640.

The first named was an ambitious scheme to be distributed over four tracts, in each of which there would be three farmed areas of different sizes respectively under mixed and arable farming. The last named was a scheme which was restricted to a single small holding, to all intents, operated by Government. The direct financial help asked for from the Imperial Council of Agricultural Research varied from Rs. 244,813 in

the United Provinces to a 50:50 basis in those presented by Sind and Orissa.

The Sub-Committee after consideration made the following general proposals—

(a) That such units should be the holding of actual cultivators, owners or tenants, carefully selected on the basis of reliability and progressiveness.

(b) That a unit or area farmed in accordance with the scheme shall be an area approximating to that usually managed with the help of 1 pair of bullocks in the Province or State given financial help. This for instance in the United Provinces is 8 acres, in Sind 16 acres, in the North-West Frontier Province 20 acres, in Orissa 7·8 acres, in the Central Provinces and Berar in the dry tracts 25 to 30 acres.

(c) That units should be dealt with in pairs, *i.e.*, every two units should be relatively closely placed, two units being defined as one block.

(d) That in addition to the operation of control and recording on the unit farms, like recording should be undertaken in the same area on 4 similarly sized and powered holdings which continued to farm as was the common local practice. A block would thus consist of two mixed farms operated under direction and four ordinary arable farms in which records would be maintained as in the Sugarcane and Cotton Enquiry.

(e) A block was required in each important tract and it might be desirable to add further blocks in distinguishing between mixed farming in rural and urban environment and in accordance with the existence or otherwise of irrigation within the general climatic or crop area. They however suggested the number of blocks as stated below in each case.

(d) That in addition to the operation of control and recording on ditions, imply the keeping of cows, buffaloes and sheep and goats or combinations of these. They also suggest, though they have not included these in framing estimates, that some poultry might in certain cases be added. In framing their estimates, they worked on the basis of the initial purchase of two good cows or buffaloes or their equivalent to each 1 plough holding plus such stock at foot or running with their dams as a cultivator might be expected to keep.

(g) Careful supervision will be necessary and for this purpose they suggest that for each block of 2 mixed farmers and 4 ordinary arable ones, there should be two Kamdars (closely attached to each holding) on pays of from Rs. 15 to Rs. 20 and a supervisor in general control of each block. (The supervisor's pay will vary between Rs. 40 and Rs. 60 according to province).

On this basis the cost of eacb block will average for one year at—

		Rs.
1. Supervisor at Rs. 50	.. ..	600
2. Kamdars at Rs. 18 each	.. ..	432
		1,032

In the United Provinces and Central Provinces it would be nearer Rs. 900 and the North-West Frontier Province Rs. 1,150. They assume that the normal district staff would provide higher supervision and the checking of the results and records registered by the staff of each block.

(h) They suggest that the necessary live-stock which it is decided should be placed on each holding, should be selected and purchased by Government and should be provided on a taccavi loan, payable in the course of five years by the cultivator, who would get some assistance between this from the grant as below :—Thus assuming Rs. 100 per cow, 2 cows per unit and 4 cows per block, this implies an investment of Rs. 400 in the block and the Sub-Committee suggest that the cultivators of each unit should be allowed Rs. 20 per annum (Rs. 10 per animal) towards meeting the repayment of the full loan, thus giving in the scheme, which should extend over 5 years, Rs. 40 per block per annum or Rs. 200 for this purpose.

They also feel that to induce farmers to come into the scheme some help will be required, specially in the early stages ; in the adequate maintenance of their stock and in new cultivation expenses. These they are inclined to reckon (1) as under stock maintenance. Rs. 60, Rs. 20, Rs. 20 per unit in the first 3 years, and (2) under new cultivation costs Rs. 30, Rs. 15, Rs. 15 per unit over the same period. Considered per block, we thus have

	I	II	III	IV	V	Total.
Towards repayment of live-stock loan	40	40	40	40	40	200
Towards stock maintenance ..	180	60	60	..	..	200
Towards seed and cultivation ..	60	30	30	..	..	120
Working cost of a block of 2 units.						Rs. 520

	Rs.
Cost of 1 block (Average)	
Supervison Rs. 1032 × 5	5,160
Other expenses on farming the block	520
Add for supervision contingencies	20
	5,700

They suggest the following allotment of blocks :—

To the United Provinces	..	6 blocks.
Sind	.. ..	5 blocks.
N.-W. F. P.	.. ..	4 blocks.
Orissa	.. ..	3 blocks.
	Total	18 blocks.

On this allotment the gross cost would be Rs. 102,600. They further suggest that the cost be divided between the Imperial Council of Agricultural Research and the Local Governments on a 50 : 50 basis.

On the above, there would be in all 36 village units financed by the Imperial Council of Agricultural Research at an average cost per unit of Rs. 1,425 over 5 years or Rs. 285 per annum.

As against an anticipated failure of the mixed farm to pay, unexpected death of live-stock and other unforeseen accidents, it might be advisable to allow for an insurance fund at probably Rs. 200 per block.

At the Advisory Board the Chairman explained that the appointment of the Sub-Committee by the Fodder and Grazing Committee did not mean that they were recommending any grant. They were only asked to lay down the general lines of work and schemes along these lines with the necessary detailed modifications will come up to the Council in due course for consideration.

Introducing the report of the Sub-Committee Mr. Allan said that it related particularly to the four provinces which had sent up the schemes, *viz.*, the United Provinces, the North-West Frontier Province, Sind and Orissa. The Chairman said that the scheme put up by the Sub-Committee appeared to be designed primarily to ascertain the economics of mixed farming, *i.e.*, to find out to what extent it would be profitable. He enquired why it was necessary to compare the results of two units on the one hand with 4 units on the other and why it was necessary to record details about income and whether the expenditure on the subordinate staff especially the Kamgars could not be reduced.

Sir Datar Singh said that the position at the present moment was that mixed farming was being advocated without any data to support it. It was not possible to carry on propaganda for the proposal without knowing the actual results of such work. Originally the idea was to start these schemes on Government holdings so that data should be collected before hand and then work should be demonstrated on private holdings. He said that he was responsible for the proposal of the Sub-Committee to take up the work on the holdings of cultivators. No doubt it appeared that a large expenditure was being incurred in recording items of income and expenditure but it was essential to have this information. He therefore suggested that this small item of *kamgars* should be left as proposed by the Committee as the Supervisor could not be expected to do all the recording work.

Rai Sahib Thadani said that it was an essential part of the scheme because the Kamgar would also attend to the practical side of demonstration work on the spot showing to the cultivators how things should be done properly. Moreover this was only a small item in the scheme

Mr. Allan said that the question of comparing the results of 4 units on the one hand and 2 on the other was considered by the Sub-Committee but it was held that four units cost practically the same money as 2 units.

The Chairman asked whether it would be possible to get anything of real value in recording the actual income and expenditure. He feared that the Kamgar would not be able to get correct figures and would try to produce figures showing better results from mixed farming.

Sir Datar Singh said that this scheme was open to supervision by the higher authorities. No doubt the Kamgar would try to make this scheme look attractive but the higher authorities or officers should go to these holdings and certify as to the correctness of the figures recorded.

Mr. Nizamuddin Hyder said that the Committee had suggested that the record should be kept on the lines of the enquiry into the cost of cultivation of sugarcane and cotton. The procedure adopted in that case was a very elaborate one and was very costly. The whole time of the staff appointed will be taken up in keeping the record. He suggested that a much simpler method should be adopted. The Chairman said that the point raised by Mr. Nizamuddin Hyder was an important one. The results of the enquiry into the cost of cultivation of sugarcane were disappointing in spite of all the details given therein. Rao Sahib Thadani agreed with Mr. Nizamuddin Hyder that a simpler record should be kept but thought that some record was essential to show how profitable the new plan of work was.

Mr. S. N. Mozumdar thought that it was not necessary to submit fresh applications. The schemes already submitted could be modified in the light of the discussion in the Board. The Chairman said that re-submission of the schemes seemed to him inevitable. The present scheme was only in the nature of a model scheme. Now the details had to be worked out and the requirements of each province clearly stated. For instance, the scale of supervisors was Rs. 50 in some provinces, while in others it might be Rs. 30 or Rs. 40. The provinces have to show what scale was applicable to them. Rao Sahib Thadani said that they had already taken this point into consideration and struck the average at Rs. 50. Mr. Allan suggested that the present scheme should be accepted and the variations in the scales of pay in the case of other provinces should be sanctioned by the Chairman without referring the schemes to the Advisory Board again. Sir Datar Singh said that the suggestion of Mr. Allan would avoid delay and should be accepted. It was accordingly agreed that the schemes, as modified by the Sub-Committee appointed by the Fodder and Grazing Committee, may be approved subject to such alterations as may be accepted by the Chairman in accordance with notes to be sent up by the provinces concerned for the purpose. It was also agreed that the record should be simplified and the form in which it should be kept should be settled in consultation with the Statistician to the Council.

ITEM No. 21 (*e*).

Question of the plantation of fodder trees. (Appendices LIV and LV.)

At the meeting of the Fodder and Grazing Committee, Mr. Howard explained that in the United Provinces a special officer had been appointed to encourage the plantation of trees producing both fodder and fuel for the villagers. His efforts had met with considerable success and the Government were considering the question of passing legislation to utilize all

waste lands for this purpose. In the meantime, the work was progressing through propaganda. Mr. Wilson said that a system somewhat similar to that of the United Provinces consisting of a combined application of agriculture cum forestry practices was proving successful in Madras. His experience, however, in regard to the growth of grass under the shade of trees was different in that grass did not grow successfully upto the stems of certain trees like Margosa and Tamarind. Mr. Mason pointed out that the most important matter was to investigate the relative nutritive value of grasses and fodder trees to find out how far the plantation of fodder trees was an economical proposition. Mr. Read suggested that fodder trees might be planted on the sides of roads and on other waste land and district officers might be circularised to encourage the plantation of such trees. Mr. Bruen said that in the Bombay Presidency they had not encouraged the cultivation of fodder trees ; he pointed out that if the cultivators would find a cheap and easy food available for cattle from the trees, they would not take the trouble of providing against periods of scarcity by storing grass and other fodders which were decidedly superior for cattle feed. He suggested that some other provisions like digging bores to give more water for grasses might prove helpful. Rao Sahib Thadani said that *babul* (*acacia arabica*) was proving useful as a scarcity fodder in Sind and the Government were giving concessions for *babul* plantations. There was, however, an urgent need to try some quick growing trees like *Shevri* (*Sesbaria aculcata*) which according to their experience was proving a useful plant for the dry regions. Dr. Burns said that the knowledge regarding the establishment of drought resisting plants in dry regions and their lopping technique was scanty and a scheme aiming at solving these questions deserved the Council's support. Mr. Ware said that the question of grass growing was linked up intimately with that of erosion and any scheme which encouraged the cutting of grasses and making hay would prove helpful in checking erosion. The question of provision of fuel for cultivators was sometimes more important than even the fodder as in many parts cattle were kept mainly to provide fuel. On an enquiry from the Chairman as to quantity of fodder tree loppings required per animal it was found that no such information was available. Dr. Kehar said that from the point of view of chemical analysis the loppings of trees like *shisham, peepal, ber* and acacia were equal to wheat *bhusa* in sustenance. The plantation of such trees was therefore useful and should be encouraged. The Committee recommended the plantation of fodder trees in arid regions where there was a scarcity of grasses and suggested that in respect of other areas experiments should be carried out to ascertain the yield and nutritive value of fodder trees and the number of cattle that could be maintained per acre therefrom and to determine the best lopping technique. Further recommendations could be made later after results of these investigations were known.

This recommendation was accepted by the Board.

ITEM No. 21 (*e*) (*ii*).

Application from the Government of Sind for a grant of Rs. 86,400 spread over a period of ten years for a scheme to establish tree plantations for fodder purposes in Sind. (Appendices LIV and LV.)

At the Fodder and Grazing Committee, Rao Sahib Thadani introduced the scheme. Mr. Ware was of the opinion that the design of the

proposed experiments was faulty and was not likely to lead to useful results. The best course would be to find out the nutritive value of different trees first and to carry out the plantation experiments afterwards. The necessity for having 12 centres and for an area of ten acres for each centre was also questioned and it was suggested that single tree experiments might suffice. In reply it was pointed out that it was necessary to collect accurate data about different kinds of trees in different areas and estimate their value. Dr. Burns suggested that it was more appropriate that these proposals for plantation of fodder trees should be linked up with the Dry Farming Schemes. The Committee agreed to this proposal and suggested that the scheme should be revised accordingly.

The Board accepted this recommendation.

ITEM No. 22 (*b*).

(i) *Reports on the work of Provincial and State Fodder and Grazing Committees.*

At the Central Fodder and Grazing Committee Mr. Bruen said that the present system of working by the Provincial Committees was not likely to lead to any useful results. There should be some executive body either at the Centre attached to a suitable Institute like the Forest Research Institute at Dehra Dun or in the Provinces to see that the work is carried out. Mr. Read said that no such difficulty was being experienced in the Punjab, where the Provincial Committee made recommendations to the appropriate Government Department which then took up the work where practicable. Mr. Mazumdar endorsed the views of Mr. Bruen. Mr. Howard said that whatever work was carried in the United Provinces it was done at the instance of the Provincial Fodder and Grazing Committee which gave directions and the need for the creation of a special executive body never arose. Mr. Mason said that their hands were already full and they could not undertake extra work without additional staff. For erosion work which was intimately connected with grazing problems he suggested the formation of a Sub-Committee of the Central Fodder and Grazing Committee to deal with the subject and said that the Sub-Committee when formed might look into the advisibility of entertaining some more staff. The Committee felt that the only effective way of ensuring that action was taken on the recommendations of the Provincial Committee was to draw the attention of the Provincial Government and the Department concerned to the matter. The reports were recorded.

(ii) *Short bibliography by Assistant Agricultural Expert of recent useful papers on grasses and grasslands.*

The note was recorded.

(iii) *Consideration of the draft grazing rules for the Province of Bombay.*

At the Central Fodder and Grazing Committee, Mr. Bruen pointed out that the draft rules need not be discussed as owing to certain difficulties they were being reconsidered by the Provincial Government. The matter was accordingly postponed.

(iv) *Reports on trials of imported grasses and leguminous fodder plants.*

The note was recorded.

(v) *Note by the Agricultural Commissioner with the Government of India on the joint project schemes of the Imperial Council of Agricultural Research and the Indian Central Cotton Committee and their bearing on Fodder and Grazing problems.*

At the Central Fodder and Grazing Committee Dr. Burns while explaining the note said that the chief purpose was merely to indicate how fodder and grazing should be worked up in the development of ' projects '. It was agreed that the Sub-Committee on mixed farming would bear this in mind when drawing up the scheme.

(vi) *Decisions of the Governing Body regarding grassland improvement schemes recommended by the Committee and the Advisory Board.*

The note was recorded.

(vii) *The desirability and feasibility of storing grass for long periods against the years of bad rainfall.*

At the Central Fodder and Grazing Committee Mr. Bruen, while explaining his note said that in Bombay it had now been decided to store fodder in the neighbourhood of towns. He then referred to the plant for artificial drying of green grass in young condition when it was very nutritious which he had devised and installed. The plant was very simple to work, cheap and portable and the moisture percentage of the fresh grass could be reduced from 70 per cent. to 7 per cent. during the monsoon period, when under ordinary conditions it was difficult to dry the grass. He strongly advocated the iutroductiou of this plant. Mr. Read advocated for village conditions the making of hay in preference to silage when on one cutting a green crop could be taken ; where possible, he favoured silage making on the ground that silage was difficult to transport for sale. Therefore the peasant would be obliged to keep it as a fodder reserve against scarcity. Mr. Wilson explained the method prevailing in Madras which was more or less akin to that adopted in Bombay by which fodder was now stored nearer famine areas and in places from where it could be marketed, if it was not wanted for famine purpose. The Famine Relief Commissioner's help was sought to indicate the places where fodder could be stored. The general practice was to store the hay and when that was not required to liquidate it. Any loss incurred in that connection was considered as an item of insurance. Sir Datar Singh said that silaging of both roughage and green fodder together in alternate layers in the pit produced valuable food for cattle. He had found it a useful method of disposing of a large quantity of green fodder. Dr. Mitra said that silaging was done in pits in the upper Shillong Farm for the last thirty years and was considered to be the best method of preserving cattle food. A silo of mixed grasses including wild grasses was also found to produce satisfactory feed. Mr. Read said that the use of *kucha* pits should be recommended as the difference in the so-called loss in them when compared with *pucca* pits was only a shrinkage of 7 to 8 per cent. The walls of the silo pits should be vertical and not sloping as recommended by some as in the latter case there was more likelihood of air entering into the pits. Dr. Kehar said that from the nutrition point of view there was 20 per cent. more of carotine in silage than in hay. Dr. Kehar said that from the nutritive point of view grasses cut at shorter intervals was an ideal food for the cattle as it provided sufficient protein.

The difficulty however, would be encountered when a private individual found the machine not coping with the quantity of grass that would be available during monsoon. Mr. Bruen said that his plant could dry grass at the rate of 3 cwt. per hour. The consensus of opinion was that the apparatus be given a trial and the Committee recommended that the idea be approved in principle and a scheme put before the Advisory Board. It was also generally agreed that the preparation of silage should be encouraged ; this however would not owing to transport difficulties help to solve the problem of fodder supply in years of famine, it was therefore necessary to arrange for the storage of fodder which would be available in times of need ; the loss incurred in connection with such storage would have to be borne by Government.

At the Advisory Board, Mr. Allen said that he understood from the report of the Committee that some assistance would be given to Mr. Bruen in getting his plant for drying grass. It was pointed out in reply that the Committee recommended that the idea be approved in principle and a scheme be put up before the Advisory Board.

Mr. Ware referring to the grass-drying machine said that he was not present at the meeting of the Committee when this subject was discussed. He informed the Board that work on the nutritive value of dry grasses in this country was being done at Izatnagar. This method of drying grass by machine was expensive. The only question that arose was whether the work should be carried out at Izatnagar or at Poona where laboratory facilities would not be so good as at Izatnagar. He suggested that the work might be done in conjunction with the Izatnagar Institute. Sir Datar Singh said that in devising this machine Mr. Bruen's idea was to bring it within the reach of a cultivator of average means and to make it cheap and economical. He would not like the scheme to be made very expensive. He suggested a trial could be made at Izatnagar. The samples of dried grasses might also be sent there for determination of their nutritive values. The Chairman said that if it was desired to carry out co-ordinated work at Izatnagar, that could be done when the scheme came up to the Advisory Board. Mr. McDougall felt rather sceptical regarding the outcome of this proposal for grass drying in India as the bulk of the grasses that would be available in one cut would be very small. It was agreed that Mr. Bruen should send up his proposals.

ITEM No. 22 (c).

Note by the Agricultural Commissioner with the Government of India on the present position and future requirements of anti-erosion work in India [also see item No. 30 (b).] (Appendix LVI.)

At the Central Fodder and Grazing Committee Dr. Burns explained the note and expressed the desirability of sending an experienced officer to America for studying soil conservation problems there. Mr. Mason said that the problem of anti-erosion work was a big one and it needed to be looked into by an All-India organisation. He suggested the constitution of a Sub-Committee of the existing Central Fodder and Grazing Committee to formulate concrete proposals for carrying out co-ordinated work on this problem. Mr. Read endorsed these views and suggested that the Chairman of the Sub-Committee should be the Inspector General of

Forests. It should be a small Committee with power to co-opt members. The Committee recommended that such a Sub-Committee should be formed and the personnel be left to the Agricultural Commissioner.

The Board adopted the recommendation of the Committee.

ENTOMOLOGICAL AND PATHOLOGICAL RESEARCH.

ITEM NO. 23, 23-A, 23-B.

1. *Technical programme—Extension scheme for Research on insect pests of sugarcane at the Imperial Agricultural Research Institute.*

1-A. *Technical programme of pyrilla work under the United Provinces insects pests of sugarcane scheme.*

Technical programme of pyrilla work under the Punjab insects pests of sugarcane scheme. (Appendices LVII, LVIII and LIX.)

These were approved at the Entomological and Pathological Committee.

At the Advisory Board, Khan Bahadur Afzal Husain referred to the programmes of pyrilla work in the Punjab, United Provinces and at the Imperial Institute of Agricultural Research and pointed out that there was a great deal of duplication of work and that the programmes were not sufficiently detailed. One could not understand the aim of the work. He suggested that the programmes be sent for vetting to a couple of Entomologists before snbmitting them to the Advisory Board.

Dr. Burns explained that the programmes referred to were of running schemes and if they were sent for criticism, the current work would suffer. He saw no objection to schemes being reconsidered at the time of the Sugar Committee. He did not think there was any likelihood of getting time for the consideration of the programmes before the Sugar Committee. A study by circulation would be unsatisfactory as it was a case of "as many entomologists so many opinions". All that could be done was to consider these programmes in the light of Khan Bahadur Mian Afzal Husain's remarks at the time of the Sugar Committee.

Khan Bahadur M. Afzal Husain remarked that it was necessary that instead of the programmes going for criticism to the Sugar or any other committee, they should first be criticised by the Entomologists' Committee.

The Director, Imperial Veterinary Research Institute said that to prevent over-lapping programmes on the veterinary side should be similarly treated.

The Chairman said that there should be no objection to sendiug the technical programmes of these schemes to 2 or 3 selected entomologists for their opinion and if it was necessary to revise the technical programmes that could be done by the experts of this Council. The matter might be put up before the next meeting of the Committee if there was a sharp difference of opinion. In the meantime the work should go on according to the programmes submitted.

The Board approved of this suggestion.

ITEM No. 24 (*a*).

Application from the Government of Madras for a grant of Rs. 54,104 spread over five years for a scheme of research on the important phytophthora diseases of the major economic crops of South India. (Appendices LX and LXI.)

At the Entomological and Pathological Committee it was decided that this scheme could not be accepted. The discussion indicated that a great many of the Phytophthora species were already being dealt with in one way or another by workers in the Agricultural Departments throughout India. The scheme as presented also seemed to deal mainly with the testing of control measures. If the author should desire to put up another scheme, he should take into account the above facts and should show exactly what had been done or is being done in India, exactly where further information is required and clearly indicate what work is proposed on the mycological aspect of the problem.

The Board accepted the recommendation of the Committee.

ITEM No. 24 (*b*).

Application from the Muslim University, Aligarh, for a grant of Rs. 5,108 spread over two years for conducting research on the fundamentals of biology of insect pests of important local crops, together with the study of their parasites and the essential features of their parasitism coupled with training of post-graduate students in agricultural entomology. (Appendix LXII.)

The Entomological and Pathological Committee regretted that it could not accept this scheme on account of its comprehensiveness and vagueness and agreed that schemes on specific problems only be considered.

At the Advisory Board Sir Mohd. Yakub said that this scheme had been rejected on account of its comprehensiveness and vagueness. These terms were contradictory. In his opinion the scheme ought not to be rejected summarily. The defects in the scheme should be pointed out to the University authorities and they should be asked to submit a revised scheme.

Dr. Burns said that the scheme was comprehensive in that it tried to tackle a large number of problems and vague as it did not give details. The Council was always prepared to help but specific proposals should be put up before it. The scheme submitted was for conducting research on the fundamentals of biology of insect pests of important local crops, etc. The difficulty in these omnibus and big schemes was that there were no details.

The Chairman said that the remarks of the Committee would be forwarded to the University and they would be asked to send up proposals in the light of these remarks for research on specific problems.

The Board agreed to this.

ITEM No. 24 (*e*).

Scheme for the survey of sugarcane borers—proposals to test the new sampling technique in a few selected areas. (Appendix LXIII.)

The Entomological and Pathological Committee after a considerable discussion accepted the proposals made in Mr. Isaac's note and it was

decided that the new programme should be started from the 1st of January 1940.

Khan Bahadur Afzal Husain said that this scheme was on the same footing as the cost of production enquiry which produced no result. This was designed to find out something about the borer population. This scheme had been handled very badly because it went to the Sugar Committee first, then to the Entomologists Committee, then to the Sugar Committee again. In this way the scheme had not been properly examined. It was proposed in the scheme to send out one Assistant and two fieldmen in the villages in 9 centres in India to find out the population of borers and the different types of borers that exist in the different varieties of sugarcane. He then referred to the table at page 7 of the note circulated and said it would be difficult for the men to record the observations wanted.

Taking the borers first, there were ten or twelve borers and the staff sanctioned by the Council were to study the anatomical characteristics to discover some easy method to distinguish these borers in the field. He enquired whether anything had been done to enable ordinary fieldmen and assistants to distinguish these various borers. So far as he was aware even an experienced entomologist might not be able to distinguish these borers at the early stages.

As regards the varieties of cane, Khan Bahadur Afzal Husain was very doubtful whether these men would be able to distinguish the different varieties of cane and they would have to be guided by cultivators who were not well aware of the different varieties themselves.

As regards the labour involved in this investigation, he pointed out that these three men were expected to be out in the field for 22 days in a month and each one was to examine about 15 clumps every day and to select the particular clump in which there were borers. He was very doubtful whether this work could ever be done accurately.

He then referred to the contribution that had to be made to the Statistical Institute at Calcutta and also to the employment of a Statistical Assistant in he scheme itself. He suggested that either the Assistant be transferred to the Statistical Institute or the contribution to the Statistical Institute should be stopped.

He said that this scheme should be carefully considered as it involved an expenditure of about Rs. 68,000 spread over 3 or 4 years and at the end it should not be found that the results were the same as in the crop costing enquiry.

Dr. Burns said that this matter had had a great deal of consideration at the last meeting and this was referred to at page 1 of the printed papers. A sub-committee of entomologists and statisticians sat for no less than 3 days to consider this particular aspect of the problem and the proposal before the Board was, the simplest method which would cover a considerable area. By this method observations could be made which would be valid. The low value that had been attached to this method of obtaining data was largely due to the fact that this type of planning and this type of statistical recording were not taken as the basis of work in the early stages. Professor Mahalanobis had made certain suggestions in the early

stages of the crop costing enquiry and these were not taken into account and if they had been attended to the work would have been on much sounder lines.

The forms that had been prescribed for noting down the observations looked complex, but in actual practice they were simple. With regard to the contribution to the Statistical Institute, Dr. Burns said that this was on account of the supervision and personal attention which was given by Professor Mahalanobis himself who did not accept any remuneration for this work. He appealed to the Board that this scheme should be given a chance and should not be turned down.

Khan Bahadur Afzal Husain suggested that as this survey should start only from the 1st January 1940 and as the sugarcane crop was still in season, copies of the statements be sent to Entomologists in the Punjab, Madras, United Provinces and the Imperial Entomologist at Delhi and they be asked to make, if possible, personal observations and to say whether these forms were workable and whether any useful data could be got out of it. The Council could get the result within a month. Personally, he confessed, he would not be able to do this work.

Mr. Vishnu Sahay strongly supported Mr. Afzal Husain's proposal. Dr. Burns said that personally he deprecated the action suggested by Khan Bahadur Afzal Husain. It would mean that a mass of conflicting opinion would again be collected and it would not be possible to proceed with the work. The Chairman said that that would not be difficult to overcome as the whole information could be sorted out by the Experts and if it was found that they agreed action could be taken. If the opinions were found conflicting, the matter could again be brought before the Board.

Mr. Hidayatullah said that the scheme was sanctioned for 2½ years in the first instance and work was taken up in 17 centres but now according to the recommendation of the Committee, only 7 centres would be working. He wanted to know what would be the position of the other centres which had been left out. Dr. Burns said that they would be closed.

Professor Mahalanobis said that he had nothing to do with the scheme in its initial stages but later on he came in contact with it. He added that the point raised by Mr. Hidayatullah was an important one. If it was desired to undertake a detailed census a further provision for travelling allowance should be made to enable the men, already appointed, to cover a fairly wide ground. If this was not feasible, he feared some of the centres would have to be closed. The Chairman said that closing of some of the centres appeared to be inevitable and could not be helped.

The Board accepted the recommendation of the Entomological and Pathlogical Committee. It was further agreed that in future such schemes should be placed before the appropriate Entomological or other committee, irrespective of whether they had been placed before the Sugar or other commodity Committee or not. It was also held that the opinion of the Entomologists of the Imperial Agricultural Research Institute, the Punjab, the United Provinces and Madras should be obtained about the forms within one month and they should be revised if necessary.

ITEM No. 24 (*f*).

Application from the United Provinces Government for a grant of Rs. 70,500 spread over three years for a scheme of further research on Pyrilla. (Appendix LXIV.)

The scheme was referred back for further information as to how the problems would be actually tackled in practice. It was also essential that Dr. Ramdas of the Agricultural Meteorology Section should be consulted with regard to the technique of measurement of climate, particularly micro-climate, in the various centres of observation

The observations of the Entomological and Pathological Committee were endorsed by the Board.

ITEM No. 23-C.

Summary of work done on sugarcane pests in India during 1938. (Not printed.)

At the Entomological and Pathological Committee it was suggested that an indication should be given as to the persons doing the work and the localities of the work reported.

This was recorded by the Board.

ITEM No. 25 (*b*).

Progress report of the Bombay Dry Farming Scheme 1938-39. (Not printed.)

At the Dry Farming Committee the report was introduced by Mr. Kanitkar who emphasised the fact that the season at Sholapur turned out to be one of the wettest ever experienced and that at Bijapur it was one of the best seasons experienced. The Bombay dry farming system had given very satisfactory results particularly at Bijapur. Mr. Kanitkar emphasised the important point that the drying out of light soils even in a good monsoon was so rapid that rabi crops could not be grown in it and such soils should be reserved for kharif crops. Dr. Mukherjee raised several points in connection with the report and particularly drew attention to the desirability of finding out whether microbial activity had anything to do with the success of the dry farming measures. He also mentioned the need to study the various soil types so as to be able to translate the measures found successful in one to another type of soil.

The report was approved by the Committee and the Advisory Board.

ITEM No. 25 (*c*).

Annual report of the Punjab Dry Farming Research Station. (Not printed.)

At the Dry Farming Committee it was observed that the rainfall here had been so small that many crops could not be grown at all and the yields in others were excessively small. The effect of one year's fallow on *guara* was particularly noticeable.

The report was approved by the Committee and the Advisory Board.

ITEM No. 26 (*a*).

Application from the Government of Sind for a grant of Rs. 1,34,460, spread over five years for a scheme for dry farming research in Sind. (Appendix LXV.)

At the Dry Farming Committee it was considered that there was a case for a small scheme to study the problems of what can only be called " desert farming ", *i.e.*, farming under the extreme conditions prevailing in a large part of the Sind-Rajputana desert. It was considered that a small station could be put down in the Thar Parkar district of Sind but that before starting such a station, it was necessary to have the rainfall of several places in considerable detail and that the crops grown in such areas should also be known. For the other part of the proposal, *i.e.*, the study of the problems where irrigation water in small quantity was available, it was considered that this work should be attached to one of existing research stations in Sind and that if help were required from the Council it should not exceed more than a certain small amount of assistance in the form of research staff.

The Board accepted the recommendation of the Committee and it was decided that a revised scheme on the lines suggested should be submitted by the Sind Government for consideration at the next meeting of the Advisory Board.

ITEM No. 27.

Progress report of the scheme of research into the properties of colloid soil constituents for the year 1938-39. (Not printed.)

In introducing the report at the Soil Science Committee, Dr. J. N. Mukherjee explained the salient points.

Rai Bahadur Dr. Bal said that the statement on page 15 of the report that the percentages of Sio_2 and Fe_20_3 of subfractions 1 to 5 from the black cotton soil decreased with diminishing particle size while that of alumina increased was not borne out by the figures given in Table 19. Dr. Mukherjee drew attention to the food note on the same page which explained the matter but said that he would look further into the discrepancy. Subject to this observation the report was approved by the Committee and by the Board.

ITEM No. 28 (*a*).

Technical programme of the Calcutta University Coastal Soils Scheme. (Appendix LXVI.)

The technical programme was approved by the Soil Science Committee with a recommendation that analysis of clay fractions of soils, particularly Al_20_3 and Sio_2 and Fe_20_3, should be carried out for obtaining an idea of the mobility of different constituents and also the analysis of displaced soil solution for Al_20_3, Sio_2 and Fe_20_3.

Prof. Mukherjee pointed out that the measurements recommended by the Committee are usually carried out as routine work in any systematic study of soils and pan formation and they were actually included under

the heads "Preliminary analysis of displaced soil solution" and "Chemical analysis including fusion analysis" of the Technical Programme.

The Board accepted the recommendation of the Committee.

ITEM No. 28 (*d*).

Technical programme of work under Dacca University Scheme on the nutrition of rice plant. (Appendix LXVII.)

The Soil Science Committee recommended that items (1) and (4), namely, effect of different fertilisers treatment on the fixation of nitrogen in the soils of rice field under water-logged and dry cultivated condition, respectively, should be dropped and that work should only proceed on items (2) and (3), namely, relation between rice-crop and algal growth and effect of algal growth on various transformations taking place in the rice fields. In the study of relation of rice crop and algal growth, attempts should be made to stop algal growth in the experiments of algal growth in darkness and the number and types of organisms should be recorded. With regard to the investigator's proposal to carry out work as suggested by Rao Bahadur Viswanath on the effect of algal growth in the field on the yield of the crop at the meeting of the Soil Science held in Simla in May 1939, the Committee recommended that typical algal growths from rice soils should be obtained and examined. With regard to the request to afford facilities to visit various stations for collection of algal samples to carry out the investigation on the effect of algal growth in the field on the crop, the Committee felt that no special facilities need be made and that the officer in charge of the investigation should arrange to secure typical algal samples from the rice research stations of different provinces. The Committee further recommended that this item of work should be substituted for that proposed in item (1) of the scheme.

The recommendations of the Committee were approved by the Board.

ITEM No. 28 (*e*).

Technical programme of work of the scheme of sub-surface investigation work in the Lloyd Barrage area in Sind. (Appendix LXVIII.)

The Soil Science Committee felt that it was premature to discuss a technical programme when the officer for carrying out the work had not been appointed and when the programme was not drawn up by him.

The Board agreed with this observation of the Committee.

ITEM No. 28 (*f*).

Technical programme of work under the scheme of research on the organic constituents of Indian Soils at the Dacca University. (Appendix LXIX.)

The Soil Science Committee recommended that instead of carrying out work on the soils of the Dacca Farm the work of organic constituents of soil should be extended to at least half a dozen other rice soils under long standing and heavily manured experiments and under varied conditions of climate. Samples should be taken after the standing crop had been harvested. The Committee further recommended that the work should be completed within the period of extension.

The Board agreed with the recommendations of the Committee.

ITEM No. 29 (*a*).

Study of soil problems in Bengal—Extension beyond 1st July 1940. (Appendix LXX.)

The Soil Science Committee thought that the scheme should confine itself to the continuation of the remaining part of the work of the scheme as previously sanctioned and should therefore confine itself to items (1) and (2), namely, evaporation of water from soil and the study of the physical properties of soil under field condition associated with tillage operations, with particular reference to the effect of various manures on drought and to the variation associated with the physical constants of different types of soil. It was the recommendation of the Committee that work on items (3), (4) and (5), namely, water requirement of crops, studies on the optimum moisture requirement for a particular crop and the influence of soil water ratio on the crop yield, should be dropped and that as the scheme had been in operation for nearly seven years the work should be completed within the extension period and after that the scheme should be terminated. In regard to the financial aspect of the scheme, the Committee agreed to the total expenditure of Rs. 13,036 as stated in Annexure II with the proviso that the Secretariat of the Council should consider the validity of the position of the leave salary and other salaries, as the Committee had not before them previous papers pertaining to scales of pay. As a consequence of items (3), (4) and (5) having been dropped the contribution of Rs. 7,530 of the Bengal Government would not be available as stated in the scheme.

At the Advisory Board the Chairman enquired whether the Bengal Government should not be asked to contribute their share towards the continuation of the scheme.

Mr. Chatterjee (Dacca) said that the Bengal Government had since sanctioned an Assistant and other accessories for which a sum of Rs. 7,530 was shown in the scheme submitted. Besides in connection with laboratory equipment and other apparatus the share of the provincial Government would come to an extra sum of Rs. 4,500. Since the extension scheme had now been modified the share of the Bengal Government might approach a 50 : 50 basis.

The Advisory Board accepted the recommendation of the Soil Science Committee.

ITEM No. 29 (*b*).

Indian Institute of Science—Cheap synthetic manure scheme—Extension beyond 1st January 1940. (Appendix LXXI.)

The Soil Science Committee recommended that work on item (3) only, namely, Night-soil wood ash poudrette, should be continued and that there was no need to go on with items (1) and (2), namely, Fertiliser value or availability of plant nutrients in compost and Composted vs. uncomposted materials and degree of necessary composting. The Committee also recommended that the scheme should be extended for two years instead of for three years with the proviso that the work should be completed within that period and the scheme terminated afterwards. The general opinion of the Committee was that field experiments should be carried out at any

agricultural station and that the investigation should not include any field experiment at the Institute of Science.

At the Advisory Board Rao Bahadur Viswanath said that this was a scheme for extension for a period of 3 years from 1st January 1940. The Committee after scrutinising the proposals thought that an extension for a period of two years should be given to enable the Institute to complete the proposed work in connection with the utilisation of night-soil wood ash poudrette.

The Board accepted the recommendation of the Soil Science Committee.

ITEM No. 30 (*a*).

Results of the analysis of soil samples from provinces by (a) alkaline permanganate method, (b) international soda method, and (c) hypobromite method. (Appendix LXXII.)

The Soil Science Committee recommended that on the basis of the analytical data and their statistical examination the International Method should be employed in the dispersion of soil for mechanical analysis. If for any reason another method had to be employed either Alkaline Permanganate or Hypobromite Method could be used.

The Board accepted the recommendation of the Soil Science Committee.

ITEM No. 30 (*b*).

Note by the Agricultural Commissioner on the present position and future requirements of antierosion work in India. (Appendix LXXIII.)

The Soil Science Committee recognised the necessity for tackling the erosion problem and considered that they should have more detailed knowledge of erosion problems of India as a whole. The Committee endorsed the suggestion that an officer should be sent to America for studying erosion control there but would also make an alternative suggestion to bring out an expert in this work from America for advising on the spot.

The Chairman said that the recommendation of the Soil Science Committee should be considered along with a corresponding recommendation of the Fodder and Grazing Committee which had also dealt with this matter. The Board accepted this suggestion.

ITEM No. 30 (*c*).

Note by the Central Board of Irrigation on surface and sub-surface investigation in the Lloyd Barrage area in Sind. (Appendix LXXIV.)

The note was recorded by the Soil Science Committee and the Advisory Board.

ITEM No. 31 (*a*).

Application from the Government of Bombay for a grant of Rs. 61,300 spread over five years for an All-India Crop Forecast Improvement Scheme. (Appendix LXXV.)

Mr. Patel in introducing the scheme said that the importance of correct crop forecasting was too well known to require mention. He also

pointed out that there was a scheme for examining the forecasts of cotton and it was found that there were many deficiencies in the forecast. This was now put up on similar lines with a view to see whether forecasts of crops could be improved all over India.

Mr. Livingstone said that some sort of correction in the standard yield of the different crops was required.

Mr. Patel said that certain defects had been noticed as regards area, valuation and standardising and it was expected that probably these defects existed in other parts of India as well. It was, therefore, suggested that these might be located and the Directors concerned advised to take necessary action.

Rao Bahadur M. Vaidyanathan said that for an All-India scheme of crop forecasting if each province could tell the Statistician at the Headquarters of the various factors that influenced the yields of individual crops in each individual area, such as existence or absence of irrigation facilities, seasonal influence, improved variety, soil variation and so on—then the whole problem would reduce itself to one of finding out the proper sampling technique to be adopted. The question should be considered an All-India one in a co-ordinated scheme with details to be worked out by each individual province or State. Some work had been done for cotton and jute with regard to acreage and yield and it should be made to harmonise into an All-India scheme for all the crops. It was meaningless to have a scheme for one province only which might not be useful to other provinces.

Rao Sahib Thadani said that this scheme had been based on a scheme which was carried out under the Indian Central Cotton Committee for the provinces of Bombay and Sind. This work has been very valuable to both the Provinces and as the idea is to institute similar enquiries in the case of other crops, he felt that such an enquiry would be very useful in the case of other crops.

The Chairman said that the scheme financed by the Cotton Committee must have pointed out certain defects in the present system of forecasting and suggested remedies. Would not exactly the same difficulties and the same remedies apply to other crops? If so why should it be necessary to have an officer placed on special duty for working exactly on the same difficulties for suggesting the same remedies?

Mr. Patel said that in certain places a particular type of defect was very apparent while in another place there was the question of yield and in a third place there was some other difficulty. It would, therefore, appear that some enquiry is necessary.

Mr. Livingstone said that the Council should not spend 2 lakhs of rupees spread over 10 years when the Cotton Committee had already been spending money. Certain difficulties with regard to a number of commodities were already known and now it was for the Agricultural Departments to correct the standard yield and without spending 2 lakhs we could get very close to the actual figure in a very short time. Mr. Livingstone pointed out that the area under linseed in the United Provinces was an area of mixed crop and the Agricultural Department made no attempt to see year by year whether it was a mixed area. With regard to

coffee there are certain areas or holdings for which the figures are not simply collected. Two lakhs of rupees in order to tackle a very obvious problem which ought to be tackled by the Agricultural Department was not justified.

Mr. McDougall said that this was an All-India scheme and work on All-India basis should not be undertaken by any particular province. He asked whether it would not be better if this scheme were worked by the Imperial Council of Agricultural Research. He was afraid that if this money were sanctioned for Bombay, possibly a good deal of work would be done with reference to Bombay and very little would be done with regard to other provinces. It should therefore be an Imperial Council of Agricultural Research (central scheme). Mr. Patel had no objection to this being done.

Mr. Carpenter said that this scheme was designed for the improvement of All-India crop forecasts but there was no indication how the work will be done. He suggested that this should be thoroughly discussed in a committee consisting of those persons who are capable of dealing with such matters. The scheme as it was presented to the Board should not be approved both because it was not a scheme in the strict sense of the term at the moment and also because it would be necessary for it to be discussed by representatives throughout India.

Mr. Stewart said that as regards the improvement of crop forecasts, a great deal of attention had been paid to this subject so far as cotton was concerned, by the Indian Central Cotton Committee. It has had a special Sub-Committee for this purpose for some years past. At the last meeting of the Indian Central Cotton Committee, a proposal for crop-cutting experiments was discussed in connection with the improvement of crop forecasts. The reason why our forecasts were inaccurate was the fact that our standard yields were pitched too low and in order to improve these standard yields one main essential was to do crop cutting experiments on a large scale. He suggested that no further steps should be taken in regard to any other crop until the results of the crop cutting experiments which were in contemplation by the Indian Central Cotton Committee were known.

The general consensus of opinion of the Board was that this scheme should not be recommended.

ITEM No. 31 (*b*).

Model Projects, Bombay Scheme. (Deleted.)

The Chairman said that he had referred to this matter in detail in his opening remarks and had put forward certain suggestions as to his idea of what constituted a model project and how best it could be worked. As the Director of Agriculture, Bombay, had sent in an advance copy of a note on the project system, he requested Mr. B. S. Patel to explain his scheme.

Mr. Patel said that the note was prepared with a view to apply certain improvements in the cultivation of crops in the Dhoad Taluk of the Bombay Presidency where cultivation was very backward and distinct improvement had been achieved on the farm by these methods. The methods were mostly of a cultural nature. He was of the opinion that it was not

advisable to introduce a large number of improvements in a limited area because there were difficulties in persuading the cultivators to adopt numerous improvements at the same time and they did not prove economical. His idea was that a few outstanding improvements which are understood by the masses should be introduced over a larger area. He referred to the success he had achieved in connection with a programme of controlling the Spotted Boll Worm over 8,000 acres of cotton in the Broach District. In three years time 93 per cent of the total area was cleared of this pest. He was therefore of the opinion that to start with the unit should be *taluk* for introducing improved methods. Rao Sahib Thadani said that in order to make some progress in the working of these projects, it was necessary to adopt a common plan which could be easily adopted by the Provinces concerned. He suggested that a few Provincial Directors of Agriculture should meet and suggest a basis for putting up such projects. It was very necessary that such projects should be carried out in as many provinces as possible.

Mr. McDougal said that it would be simpler to evolve a project for rice than for any other crop for the reason that in most provinces rice is grown year after year on the same land. The question of rotation does not come in except to the extent that they do grow a catch crop but that is put in at the time of the last watering about October. The *ad hoc* Committee had for example mentioned a few items of the programme that could be included. These were better varieties, use of artificial manures, use of green manure and the introduction of legumes. Mr. Allan said that a good deal depended on what was going to be covered under a particular project. If the project was going to be simply an application of 3 or 4 outstanding methods of improving a crop this could be very well settled by Mr. Patel but if a project was to include such matters as Animal Husbandry, drainage, soil conservation and water conservation which required certain adjustments in the fields, then the experiments would have to be carried on a selected area where the villagers could be induced to adopt the various practices for the general improvement of agriculture.

Mr. Stewart said that the Punjab Department of Agriculture had examined the question and were still examining it. They had in the Punjab the Village Farmers' Association, which cost nothing, but where activities embraced all the matters which this project contemplated. They were examining whether in any way the scope of these Associations could be extended. A full account of these associations was already published in one of the Council's Journals.

At the present time there were 5,000 such associations in the Punjab and they were spreading rapidly in different parts of the Province. Mr. Stewart said that it appeared to him that these Associations were the best means of serving all the purposes which it was desired to include in a 'Project'.

Dr. Hidayatullah said that they had in Bengal similar organisations called the Union Board Farms, of which the total number was about 90. On these farms improved methods of agriculture were being demonstrated to cultivators in the form of the use of improved ploughs, application of artificial manures and growing of improved seeds. These Union Board Farms were serving the object underlying a Project.

Dr. Burns said that the term ' Project ' was used in the Soil Conservation Service in America whereby practical soil-conserving methods were demonstrated to farmers in all parts of America. He referred to the 1938 edition of ' Soils and Men ' issued from America which explained further details of the use of this system.

Mr. Livingstone said that project was very largely a matter of making a survey of a village before starting a plan of work. He asked Mr. Stewart whether he could not arrange to have a survey made of some of these villages where the Associations were working and then ask them to adopt improvements proposed.

Mr. Stewart said that they proceeded in the same manner as was indicated by Mr. Livingstone. Before any improvements were undertaken the staff of the Agricultural Department first made an intensive survey of each village to see what measures could be undertaken most profitably.

The Chairman pointed out that a Project included not only agricultural farming but the best utilisation of the land from the point of view of the maintenance of cattle also. He invited the views of the Directors of Veterinary Services also on this point.

Mr. Nizamuddin Hyder said that in Hyderabad there were about 25 aided farms at which the cultivators were shown the improvements recommended by the Department. These included all details starting from the lay-out of the farm to the disposal of the produce. A grant-in-aid was also given by the Government in the form of improved implements and pure seeds, etc. Recently he was asked by his Government to prepare a model project for educated graduates. He had prepared a small scheme for the purpose, in which he had proposed a regular cropping scheme with rotations. He had also included some animals for milk production. So far as Hyderabad was concerned it would be easier to have such schemes worked at individual holdings rather than in whole villages. The Council had rightly decided that these projects were to be classed as Development Research because they were really not in a position yet to give advice on projects in general.

Mr. Ware said that the reason why there was no response to the Chairman's request to Veterinary Officers present at the Board to give their views on the subject was that the idea of the Veterinary Officers closely associating with farming practice was rather a new one. In drafting these model projects it should be remembered that it was some form of mixed farming that was aimed at and that mixed farming did not only include keeping of milch cow and working bullocks but also other animals, *e.g.*, sheep, poultry, etc.

Mr. Mohd. Aslam Khan said that in the North-West Frontier Province there were about 16 model farms consisting of single holdings and on each of these a Kamdar was stationed. The ploughing practice of that holding was surveyed previous to starting the scheme and then a fresh ploughing scheme was prepared for the cultivators to follow under the advice and instruction of the Agricultural Staff. A pair of bullocks of improved breed recommended by the Veterinary Department and improved seeds and implements were provided by the Government on condition that the farmer was at liberty to return the things to the department without any obligation. If after three years of experimenting with

them under departmental supervision he was still not satisfied about their utility on the contrary if he found them profitable, he was to pay for them by instalments as for a *tacoavi* loan.

This treee years' scheme was in the second year of its working and at the end of one year more, he would be in a position to show some results.

Mr. Vishnu Sahay said that in the United Provinces there were three schemes in progress embodying this idea of co-operative farming. The area covered was about 80 to 150 acres which were more or less at the disposal of the Agricultural Officer-in-Charge of each scheme. It was for this officer to plan out which breed of cattle should be kept, which crop should be sown and of what variety, and so on. This scheme was yet in its initial stage and he was not in a position to say how far it would be successful. One objection to this, however, was that it was a bit expensive, in so far as the Government were at present expected to provide for improved seed, implements, etc. The United Provinces Government had sanctioned about Rs. 12,000 for this purpose. Another line of work was in charge of fieldmen attached to seed stores the total number of which was about 600. This was mostly carried out on the lines followed in the Punjab and the idea was taken from Mr. Stewart's article. Under this scheme the trained supervisors would take up a few villages and make a survey and then a programme would be drawn up by the senior officer, not below the status of Deputy Director of Agriculture. The programme included sowing of improved varieties of crops in suitable areas, introduction of improved implements, improvements in cultivation practices, stoppage of ratooning, application of balanced manures, intensive cultivation of leguminous crops, regular cleaning of village water channels, prevention and control of diseases, block sawing, etc. He could not say how far the staff would be able to carry on this programme.

Sir Datar Singh said that it was of utmost importance to start these projects. Up till now the provincial governments were maintaining demonstration farms which, although very good for research work and for satisfying the officers and staff of the Agricultural Department, were not of much use to cultivators, as the improved practices evolved by the department were not being adopted by them. There were very few cultivators or zamindars who went to see these demonstration farms. The Agricultural Department had now gone a step further by trying out some of their improved methods on the cultivators' own holdings. This had proved of some use but this was again not on the lines of mixed farming. In this too the difficulty was that as soon as the Agricultural Officers had left the spot, the cultivators did not pay much attention to their instructions and the experiment, therefore, lost its value. Finally he strongly supported the suggestion of trying 'project' system on a single holding. The difficulty at present was that the cultivator was of a very suspicious nature and he did not adopt the new method unless his income was ensured. He, therefore, suggested that these projects should be started on a single holding in a village and at the same time the income of the cultivator who was going to do this should be ensured.

Mr. M. I. Malik said that paddy plant beyond giving rice provided straw as well which was a poor food for cattle. The straw was of two kinds, *i.e.*, one from *aus* paddy and the other from *aman* paddy and there

was difference in the quality of these two straws. In the introduction of a project care should be taken that it does not take away from the cattle useful fodder like jowar, etc., and substituted by a poor food of the type of the rice straw.

Mr. Rama Reddy said that there were still some villages in the Madras province where the agricultural improvement work had not been taken up seriously and where such a scheme could be started. It was possible to start there from the very beginning, *i.e.*, from the point of preparing manure to the point of harvesting. But if the work on these lines was taken up in one village it would mean upsetting the work of the whole Taluka. The scheme was likely to be expensive, and could only be introduced if funds were provided for it. If this suggestion was acceptable to the Council, he was prepared to arrange for the introduction of improved methods on the lines suggested by Dr. Burns.

Dr. S. K. Mitra said that so far as he could understand most of the work on the lines of ' project ' system was going on already in almost every province. Even in Assam this had been taken up as a part of rural reconstruction programme. There were five centres where this work had been started, each centre consisting of a group of 20 to 25 villages. In these centres special work was done by the Agricultural Department with the co-operation of other departments concerned. A few precarious tracts had been selected where crops could not be grown and one particular locality was intended to be innundated every year to demonstrate the cultivation of rice there. Only individuals could be induced to take up the work. In Assam there were a number of places where the individuals were helped with improved seeds, manures, implements, etc., but that sort of work was not required in a project. A special place or a group of villages was required where some difinite work should be carried on. The best plan for the Imperial Council of Agricultural Research would be to chalk out a definite line of work and ask the Provincial Governments to take up the schemes.

Diwan Bahadur Raghaviah said that if a ' project ' was to be worked on a voluntary basis then, speaking from his experience of the South Indian villages, he did not think it would be possible to include in the project all the holdings in a village. Further, he did not think it would be profitable to confine the project to a single holding because it was too small. He added that if a fairly large number of people in a village was willing to work this project on a voluntary basis, it could be introduced but to aim at an entire village would not be correct estimation. Mr. Allan said that if the cultivator was ensured that he would not lose, he would gladly come forward to follow any advice.

The Chairman in summing up said that a very interesting discussion had taken place. He took it that the Provinces and States would now, in the light of this discussion, put up their schemes, if they so desired. In fact in some cases no scheme would be necessary because it appeared that some thing along these lines was already being done by the provinces. Elsewhere a scheme might be necessary if the Provincial Government was not prepared to finance the same itself. If, however, the Directors felt that they would like to have some sort of standard scheme, he suggested that they might arrange to meet together one day during the course of the next few days and discuss it amongst themselves. The difficulty he

foresaw in that case was that as the project had to depend on the holding in a particular village it was not feasible to lay down any standard scheme as to what should be done. It would all depend on the village which was taken up for the purpose, but if the general idea meant more discussion perhaps it would be possible to arrange for it on any day during the meetings of the Crops and Soils Wing of the Board of Agriculture.

ITEM No. 31 (*c*).

Proposals for co-ordinated research work on Jowar. (Appendix LXXVII.)

An *ad hoc* Jowar Committee consisting of the following persons considered this matter in the first instance.

Dr. W. Burns (*Chairman*).

Mr. R. G. Allan.

Mr. G. S. Bhatia.

Mr. A. B. H. Khoorshid.

Professor L. S. S. Kumar.

Mr. J. C. McDougall.

Mr. Nizamud-din Hyder.

Mr. B. S. Patel.

Mr. P. H. Rama Reddi.

Rao Bahadur G. N. Rangaswami Ayyangar.

Mr. T. S. Sabnis.

Rao Sahib K. I. Thadani.

Mr. Vishnu Sahay.

Mr. N. V. Kanitkar (*Visitor*).

Mr. H. R. Saini (*Visitor*).

The Committee dealt with the subjects on the following six points mentioned in the note of the Agricultural Commissioner.

(1) *Varieties.*

Several members of the Committee laid emphasis on the restricted limits within which any one variety of jowar was really suitable or popular. In many cases this was a district or a couple of districts and in Madras might be even less. In the Central Provinces with its very compact large block of jowar in Berar this condition did not hold so markedly and the Saoner jowar held the field there. In certain provinces such as Madras and the United Provinces a fair amount of work has been done on the survey and description of jowar varieties and in other provinces there has been little or no systematic work done. It was decided that a small sub-committee should undertake the working out of a schedule for the description of jowar varieties in the same way as has been done for cotton and rice, and as is being done for wheat. This small sub-committee should consist of Rao Bahadur Rangaswami Ayyangar (Chairman), Mr. Bhatia, Professor Kumar and Mr. Sabnis. At this stage the question of seed multiplication was taken up. The difficulties pointed out were

that the grain could not be kept in storage in large quantities. The production of pure grain over a big area was also difficult on account of the amount of cross-fertilisation which takes place. These two difficulties, therefore, definitely determine the nature of seed multiplication centres which should (1) be so arranged that only moderate amounts are stored in one place, (2) the seed distribution in a solid block (such as the whole of a village) should be covered by one variety.

It is understood that these principles are being followed particularly in the Central Provinces and Madras. It was suggested that the Imperial Entomologist should be invited to work out some cheap method of keeping jowar grains from being attacked by insects in store. Members gave their experiences as regards the use of napthalene (which renders the seed unfit for being eaten afterwards) and mercury which is a common practice in Kathiawar in Gujerat and seed which has had mercury put in the storage vessal is quite fit for human consumption.

Striga resistance.

Professor Kumar stated that he had now got a type which was 92 per cent resistant and in which the resistance had been built up during the last few years from about 60 per cent. He confirmed the fact that Striga seed will not germinate, if the host is not present and stated that it had a very long life. Pole-Evans and Saunders in South Africa claim that it has 15 years longevity. Rao Bahadur Rangaswami Ayyangar mentioned a variety "Bouganhailo", an African variety which had been sent to him by Mr. Sampson in Kew. It was a 100 per cent resistant but had very bad agricultural properties. Pending further work by Professor Kumar in the Striga research (which is financed by the Imperial Council of Agricultural Research) the Committee felt that further work on the production of Striga resistant variety in the provinces would have to wait for a further development of Professor Kumar's work.

As regards field measures against Striga, none of those appear to have been very successful and the real remedy lies in the production of resistant varieties.

Drought resistance.

Selection for a physiological quality of drought resistance as such was regarded as not feasible but the Committee pointed out that the following characters were directly connected with drought resistance and should be given due weight in making selections for areas of precarious rainfall :—

(1) dwarfness,
(2) earliness,
(3) vigorous early development of roots, and
(4) deep rooting.

(4) *Diseases.*

All provinces in which Jowar is important have for years carried out intensive propaganda in the use of sulphur or copper sulphate against smut. Most of the other fungus diseases are not important except helminthsporium. In the United Provinces which is some times attacked by this epidemic further work is required.

Insect pests.

The life history of the Jowar borer is well-known and the methods required for defeating it. It was agreed that what is particularly required there, are measures to prevent infection of one crop by another, *e.g.*, such as chaffing of the fodder before April. Mr. Rama Reddi drew attention to a sticking insect (calacaros) which was doing considerable damage on the Jowar crop in the Ceded Districts. The Committee agreed that more work appeared to be required on it.

The " Chitka " disease.

This appears to be important only in certain parts of the Bombay-Deccan and is due to a combination of low moisture and low humidity. It is therefore not a disease which can be controlled.

(3) *The yields of Jowar and ways of increasing them.*

It was pointed out that, while it is not difficult to increase the yields of Jowar, it is generally not economic to do so. In rotations in which jowar occurs, it is generally the alternate crops which are manured, *e.g.*, cotton or sugarcane. In the Dry Farming Station at Sholapur, farmyard manure at the rate of 5,000 lbs. per acre gave a plant which was much more economical of water. In the United Provinces 50 maunds of compost was given as a rule on the Government farm with admirable results and in the Punjab very heavy manuring is given to the fodder jowar. Special emphasis was laid on the necessity for getting some leguminous crops which could be grown along with or in rotation with rabi jowar.

Mr. B. S. Patel drew attention to the very heavy yields that could be got with even a very small amount of water and additional labour and suggested that this might be exploited where jowar areas were limited and labour was available. It was also of course obvious that the elimination of borers and the spread of improved varieties would also increase the yield.

(2) *The place of jowar in a planned agriculture both as to its economic and its value in rotations.*

It was recognised that on account of its necessity as a food to man and beast, the jowar crop would remain in rotations but it was also pointed out in certain places that there has been a real danger of the jowar crop being reduced to make way for cash crops which might temporarily be paying. In Madras the area under cereals had been reduced from 9 to 7 million acres in recent years and largely replaced by groundnuts. In Kathiawar, there had also been an excessive cultivation of groundnuts at the expense of jowar. It was emphasised that a balance had to be struck between the various crops and that food and fodder crops should not suffer.

(5) *Jowar in human and animal nutrition.*

Reference was made to Dr. Aykroyd's recent pronouncement regarding the nutritive value of Jowar as compared with rice and the undoubted place that it occupied in animal feeling.

Rao Bahadur Rangaswami Ayyangar drew attention to certain results obtained in the United States of America in which growing cereals mixed with pulses was said to increase the protein content of the cereals. He also mentioned the increase in fodder value when legumes were grown with jowar.

(6) *Other means of utilisation of jowar, e.g., malting, etc.*

Mr. Rama Reddi informed the Committee that a semi-commercial plant for testing on a large scale which had already proved the method of malting jowar was about to start work.

Mr. B. S. Patel stated that malt was required for removing starch before dying of textile fabrics.

Additional subjects.

Silage was also discussed. In irrigated areas there was not much chance for this as it was usually easier to fill it green. More work appeared to be required on the making of jowar silage and mixed silage. Reference was also made to the expense of watching the crops against birds and the possibility of producing a variety which had longer glumes and awns as a protection but it was pointed out that this meant very much greater difficulty in threshing.

Rao Sahib Thadani mentioned the difficulty of the production of seed of fodder jowars in Sind as the varieties there were shyseeders. This, however, did not appear to be a difficulty elsewhere.

The Advisory Board approved the report of this Committee.

ITEM No. 31 (*d*).

Report of the sub-committee on work on quality of crops at the Imperial Agricultural Research Institute. (Appendix LXXVII.)

While considering the scheme for the development of certain lines of research at the Imperial Agricultural Research Institute, New Delhi, the Advisory Board in May 1939 recommended that the proposals might be sanctioned subject to the condition that the questions relating to quality of crops (*vide* Sir John Russell's recommendations 10 and 11) should be further discussed by a Sub-Committee consisting of Lt.-Col. Cotter, Dr. Burns, Mr. Livingstone and Rao Bahadur B. Viswanath. The Sub-Committee met on the 11th November 1939 and considered a note on the subject put up by the Director, Imperial Agricultural Research Institute. The Report of the Sub-Committee was now for the consideration of the Board.

The Director of the Institute was absent due to unavoidable reasons and hence it was difficult to discuss the report without his help particularly as there seemed to have been difference of opinion between him and the rest of the Committee on certain matters. Moreover some of the members of the Board had not got copies of the report up to this time and were therefore not in a position to express an opinion on the merits of the scheme. Hence the Board decided to postpone the consideration of this subject till the next meeting of the Board and at the same time suggested that recruitment of the Organic Chemist for this work should also be postponed.

ITEM No. 31 (*e*).

Proposal for the further retention of the Locust Research Entomologist and his compiling staff for a further period of five months from 1st January 1940 (Rs. 8,027). (Appendix LXXVIII.)

Dr. Burns explained that at its meeting in May 1939, the Advisory Board recommended a grant of Rs. 15,500 for retaining the Locust Research Entomologist and a small compiling staff from 1st April, 1939, upto 31st December 1939, for the writing up of a monograph on the Locust research work. This has been sanctioned by the Governing Body. Rao Bahadur Ramchandra Rao, the Locust Research Entomologist, has, since February 1939, been continuously engaged on this monograph. In consultation with the Agricultural Commissioner, a tentative time table for this work was sketched out in February. Progress was reviewed by the Agricultural Commissioner and Rao Bahadur Ramchandra Rao in August of this year, and it is now plain that the work could not be completed within the original period of time proposed. This was largely due to the great difficulties in condensing such an enormous mass of work and observations. The Agricultural Commissioner is convinced that it was not due to any slackness on the part of Rao Bahadur Ramchandra Rao. The work, however, was very largely personal and depended entirely on Rao Bahadur Ramchandra Rao's own writing up, his compiling Assistant being able to provide only the raw material for this purpose. A very careful estimate now indicated that if the work was to be satisfactorily completed, an extension would be required up to the end of May, 1940. The cost of the additional extension, *i.e.*, from 1st January 1940 to 31st May 1940 will be Rs. 8,027 or Rs. 8,000 (round).

The Advisory Board recommended the scheme.

ITEM No. 31 (*f*).

Report on the Punjab Locust Research Scheme. (Not printed.)

Approved.

ITEM No. 32 (*a*).

Progress Report of Madras Sheep Breeding Scheme for 1938-39.

In adopting the report, the Animal Breeding Committee observed that the point as to whether the fine skin of the Bellary sheep, which is in demand by the trade for the making of rollers, is likely to get coarser as the wool becomes finer should be kept in mind.

The Board endorsed the observations of the Animal Breeding Committee and approved the report.

ITEM No. 32 (*b*).

Progress Report of Bombay Sheep, Sheep-Breeding Scheme for 1938-39.

The Animal Breeding Committee considered that very valuable work had been done under the scheme particularly in regard to the segregation of different types of the Deccani sheep and the technique developed for the examination of wool fibres.

The Advisory Board endorsed the above remarks and approved the report.

ITEM No. 32 (c).

Progress Report on the scheme for the improvement of poultry for table purposes in Northern India for 1938-39.

The Animal Breeding Committee noted that the work on production of fat stock had not yet been started. The report was adopted by the Committee and the Board.

ITEM No. 32 (d).

Progress Report on the Punjab indigenous sheep breeding scheme.

In introducing the report at the Animal Breeding Committee Mr. Read drew attention to the important results obtained during the year and said that the prevailing famine conditions did not permit of the work to be developed in the manner originally planned. It was also mentioned that work was being carried on at present in respect of black faced, brown faced and white faced rams but the latter appear to be mutations or sports. The Committee observed that it would facilitate the consideration of progress reports if a summary is placed at the beginning of the report.

The Board endorsed the remarks of the Committee and approved the report.

ITEM No. 32 (e).

Report by Mr. W. S. Read on Angora Goat Breeding.

At the Animal Breeding Committee, Mr. Read explained the main features of the report and pointed out the great potentialities of the Angora goat in India. He said that the mohair industry fetched an income of roughly £2 million annually to the South African farmer. This was capable of being developed as an important cottage industry in India and would provide employment to large numbers of people. Even at a conservative estimate the mohair from an Angora goat would on an average fetch annually Rs. 8 to 9 as against Rs. 2 to 3 which might be expected from the wool of a sheep. In his opinion India is in a particularly favourable position compared with other 'Angora countries' on account of the cheap labour available. Mohair was also capable of being put into Indian mills with their existing machinery. There was no necessity to depend upon foreign markets as the whole produce could be absorbed by the textile mills and cottage industry in India. The buck he had brought with him from South Africa yielded 16 lbs. 4 oz. of hair which under experiment by the Industries Department, Punjab, had produced excellent home-spun yarn. Mr. Read concluded by saying that, as the question of an embargo on the export of Angora goats from South Africa was under consideration, it was urgently necessary to arrange to earmark the number of goats required for development work in this country, and to make the selection in February and March, which was the best season for the purpose in South Africa. Mr. Sarwar pointed out that they had imported 2 bucks and 4 ewes from America some time ago but the experiment had not been altogether successful and enquired whether the work could be carried on an economically sound basis. In reply it was pointed out that if the work is done under proper control and right conditions, it should be economically profitable. It was also mentioned that these goats will not stand humid conditions.

The Committee thanked Mr. Read for his valuable report which was discussed at length. It was considered that the Angora goat should be given a fair trial in India both for pure breeding and for cross breeding work with suitable types of indigenous goats. For this purpose they recommended that at least three stations should be established and that Provinces and States interested in this industry should be invited to submit schemes on a 50 : 50 basis for consideration at the next meeting of the Advisory Board. It was considered that a suitable unit to work with would be 50 ewes and 2 bucks for each station, and it was suggested that Mr. Read should be requested to make immediate arrangements with South African firms for the reserving of 10 bucks and 150 does on behalf of this Council, on the understanding that this did not commit the Council in any way in regard to purchase, until some provincial schemes had been considered. The extra bucks were meant to serve as a reserve and could also be utilised for special cross breeding work.

Incidentally the Committee felt that the development of the Angora goat industry in India is likely to be greatly facilitated by the extension of artificial insemination on a field scale and suggested that the Government of India should be approached to provide the necessary facilities at the Imperial Veterinary Research Institute, Izatnagar, for applying the advances already made in this subject in Europe to the requirements of India.

At the meeting of the Board, Captain Walker said that he would like to emphasise two points in connection with the recommendations made by the Committee ; firstly that the Provincial Governments and States concerned which were taking part in this scheme be requested to submit their schemes as early as possible. Assuming that those schemes would come up for consideration at the next meeting of the Board he felt that the number of bucks and does proposed to be reserved was too small. He suggested that this number should be doubled especially in view of the fact that the South African Government were likely to put an embargo on the export of these animals. He added that even if all these animals reserved for the Council were not required afterwards it would not involve the Council in any financial liability as they were not committed in any way to purchase all the animals.

Mr. Ware said that this point had been thoroughly thrashed out in the Committee meeting of which Captain Walker was a member and it was decided that to begin with the number of bucks and does should not be increased to more than 10 and 150 respectively. It did not seem fair to reserve more than the Council was prepared to purchase. Moreover, these animals are very costly and if the number is increased still further it is doubtful if the Governing Body will agree to spend so much on purchasing stock only.

Mr. Read said that regarding the question of reserving the animals, he would like to point out that there were Angora Societies in South Africa which preferred to supply goats to countries in the British Empire rather than to other countries and they would, therefore, welcome such an order from India. Moreover it would not matter if all the animals reserved were not actually purchased. He pointed out that there was one season in the year—just before autumn—when selection of animals was made for exporting purposes and if the number of animals were to be decided at

the next meeting of the Advisory Board, after the schemes were in, he was afraid it would not be possible to select the animals until March 1941. He added that 10 bucks and 150 does would cost Rs.24,000 approximately.

The Chairman said that the chances of even this amount being sanctioned under the existing financial conditions were so small that it would be hardly worthwhile doubling the number. Mr. Allan said that as the schemes would be on a 50 : 50 basis, it would not cost the Council more than Rs. 25,000 in any case. The Chairman pointed out that this amount represented only the cost of animals and it would cost a lot more to finance the whole scheme. Mr. Egan said that our present knowledge about these animals was very limited and it was not known how they will react to conditions obtaining in India. The number, therefore of animals to be imported from South Africa, should not be very high so that if they did not thrive the loss would not be very heavy. On the other hand if they do well in this country, it will not be difficult to obtain more animals.

Mr. Sarwar observed that some Angora goats had been imported sometime back in the North-West Frontier Province from America. They had been handed over to a zamindar. The veterinary department now proposed to take back these animals and start a farm.

The Chairman said that every body had agreed that the schemes should be submitted *as early as possible*. The point for consideration now was what number should be earmarked for purchase by the Council. His own feeling was that the Board should stick to the recommendation of the Committee mainly on the ground that it was an experimental scheme and its outcome could not be foreseen at this stage. Secondly, it appeared doubtful if this would get funds for even the number which had been proposed by the Committee. Dr. Minett said that as this was entirely a new venture they should stick to the recommendations of the Committee and the number of animals should not therefore be increased at this stage.

The Board agreed with the recommendations of the Committee.

ITEM No. 32 (*f*).

Progress Report of the Bombay Poultry Husbandry Scheme for 1938-39. (Not printed.)

At the Animal Breeding Committee Mr. Bruen mentioned that the scheme provided for an income to the Imperial Council of Agricultural Research of Rs. 8,500 in five years and that this amount had already been exceeded.

The Committee considered that very valuable work had been done particularly in regard to the evolving of a fixed type of bird by crossing of the Rhode Island Red with the Chittagong. This type is stated to be very hardy and suitable for Indian conditions. They further observed that it is important that the size and number of eggs produced by any breed under development in this country should not be increased at the expense of the constitution of the birds.

The Report was adopted by the Board.

ITEM No. 32-I (*a*).

Technical programme of Mysore sheep-breeding scheme. (Appendix LXXIX.)

The Animal Breeding Committee considered that item (*d*) in para. II relating to stall-feeding should be omitted. The question of estimating the quality of wool was discussed, and it was pointed out that laboratory facilities for the physical analysis of wool will shortly be available at the temporary station to be set up at the Bombay University, and that in the meantime the best possible arrangements should be made with some local firms for testing the quality of wool by commercial standards. With these remarks the programme was approved.

Subject to these observations of the Committee, the programme was approved by the Board.

ITEM No. 32-I (*b*).

Technical programme of Kashmir Sheep-breeding scheme.—(Appendix LXXX.)

The programme was approved by the Animal Breeding Committee and the Board with the same observations as were made under the previous item No. 32-I (*a*) in regard to the arrangements for testing the quality of wool.

ITEM No. 32-I (*c*).

Technical programme of Bombay wool analysis scheme. (Appendix LXXXI.)

The Animal Breeding Committee recommended that arrangements be made to add tensile strength to the other items included in the analysis, and that the programme be forwarded to Mr. Tattersall of Cawnpore for remarks. The programme may be approved subject to such modifications as may be considered necessary in the light of his suggestions and for securing collaboration with the work on wool analysis being carried on at the Bhamburda Farm, Poona.

Subject to the above remarks of the Committee, the programme was approved by the Board.

ITEM No. 33.

Application from Mr. A. E. Slater, Mission Poultry Farm, Etah, for a grant of Rs. 36,675 spread over a period of 5 years, for the continuance of breeding experiments under the scheme for the improvement of goats in the United Provinces. (Appendix LXXXII.)

At the Animal Breeding Committee, Mr. Egan stated that valuable information had been obtained as a result of the working of this scheme. During the course of the subsequent discussion it was pointed out that the results of the scheme did not appear to be satisfactory from the economic point of view and that more detailed information should be given in the scheme about the nature of the research carried on and the benefits that have accrued from the scheme. In reply Mr. Egan expressed the opinion that the extension scheme should not include the Jamna-Pari

goat which did not thrive well under farm conditions. In the course of discussion it was pointed out that an extension would be particularly useful for carrying out progeny tests for which the *data* accumulated so far were not sufficient. Further, a better system of weaning kids at birth and daily milk recording had only recently been introduced, and it would take some time to furnish information of value on these points. It was also observed that with the exception of the Hissar Farm systematic improvement of goats had not been undertaken anywhere else in India and that it was not possible to get pedigree stock. For this reason it was essential that the Bar Bari stock at Etah, which would prove useful for the improvement of other allied breeds, should be preserved.

The Committee recommended that Mr. Slater should be requested to put up a revised scheme in consultation with the Director of Veterinary Services, United Provinces, in the light of the discussion that took place at the meeting of the Committee and that the Provincial Government may be asked to state what amount they were prepared to contribute towards the cost of the scheme.

The recommendation of the Committee was accepted by the Board.

ITEM No. 34 (*a*).

Application from the Government of Bihar for a grant of Rs. 27,130 spread over a period of five years for a scheme of sheep-breeding in the province. (Appendix LXXXIII.)

At the Animal Breeding Committee, Mr. Malik explained the details of the scheme and stated that it was being submitted for the second time after it had been duly revised on the lines suggested by the Advisory Board. It was pointed out that this scheme was supplementary to the co-ordinated scheme of sheep improvement recommended by the Sheep and Wool Committees in 1933. The Committee recommended that the work should be confined to the improvement of the indigenous sheep in Bihar starting with a flock of 200 carefully selected animals, and that the portion relating to cross-breeding with Bikaners should be omitted. This would reduce the cost of the scheme by Rs. 400, *i.e.*, to Rs. 26,730 and it was decided to recommend this modified scheme for acceptance, provided the Bihar Government agreed to bear half the total cost.

The Board endorsed the recommeudation of the Committee.

ITEM No. 34 (*b*).

Application from the Government of the Punjab, for a grant of Rs. 17,100 spread over a period of five years for a scheme to supplement livestock investigation work at the Government Cattle Farm, Hissar. (Appendix LXXXIV.)

In explaining the details of the scheme as now revised in the light of the modifications suggested by the Advisory Board Captain Walker enumerated at the Animal Breeding Committee the various facilities available at the Hissar Farm for carrying out a statistical and genetical analysis of the factors involved in large animal breeding. He proposed withdrawing from the scheme the expenditure in connection with the Veterinary Assistant, as enough technical assistance would be available at the Farm, and the Committee recommended in his place a Statistical Assisstant who

should work in collaboration with the Council's Statistician ; a computor clerk, would not then be required. The words, 'Statistical Assistant' should therefore be substituted in columns 2, 7 and 8 in place of 'Veterinary Assistant' and the provision for a computor clerk deleted. The cost to the Imperial Council of Agricultural Research would then drop from Rs. 17.100 to Rs. 15,960. Further it was recommended that the application of statistical methods to large animal breeding should be added to the programme of work and item 9 (*f*) omitted.

The Board accepted the above recommendation.

ITEM No. 34 (*c*).

Application from the Government of the United Provinces for a grant of Rs. 5,65,494 for a period of 5 years for a scheme for the improvement of Himalayan Cattle. (Appendix LXXXV.)

The general view expressed in the course of discussion at the Animal Breeding Committee was that the problem of improving the hill cattle of India was largely nutritional in character and was possibly associated with deficiencies in the soil, etc. It was, however, considered that the matter should be further investigated, but as there already exist at the Imperial Veterinary Research Institute, Mukteswar, the facilities required for the preliminary investigation of all aspects of this problem, including a herd of hill cows, it was felt that the work relating to altitudes over 5,000 feet could be as well done there at a much less cost.

As regards the question of lower altitudes it was recommended that the Provincial Government may, in consultation with the Director, Imperial Veterinary Research Institute, submit a revised scheme if considered necessary, but it was pointed out that the cattle of these areas are often mixed with plains types and that buffaloes are not bred on the hills but imported from the plains.

At the meeting of the Board, Mr. Allan said that the policy of the Council in the past had been to treat cattle-breeding as a provincial matter and not to finance cattle-breeding schemes.

Sir Datar Singh said that it was not right to regard this scheme as a provincial concern. It was a question of improving the hill cattle of India and the result of this work would not help a particular province only but would be useful to the whole country.

In reply to a query from Mr. Mazumdar, Mr. Egan said that no census had been carried out of the cattle population of the Himalayan range.

Mr. Patel said it was not advisable to improve something which did not exist. In his opinion there was very little scope under certain limited conditions to improve the cattle of the Himalayan range.

Mr. Ware said that the question was very carefully considered in the Committee and that is why the Committee recommended that as there already exist at the Imperial Veterinary Research Institute, Mukteswar, the facilities required for the preliminary investigation of all aspects of this problem, including a herd of hill cows, the work relating to altitudes

over 5,000 feet could be as well done there at a much less cost. After carrying out preliminary investigations at the Mukteswar Institute for some time, they would be in a position to say whether these hill cattle were capable of improvement. At present the hill cow was very degenerate.

Mr. Allan however maintained that the Council had definitely laid down its policy to aid the breeding of poultry sheep and goats but not cattle.

The Chairman said that when a fresh scheme comes up before the Board both these points might be raised. In the meantime the United Provinces Government may be informed that in sending up the scheme they should make it clear what the cattle population in that area approximately is and on what grounds they can justify a grant from this Council in view of the fact that hitherto we have not allotted grants for cattle-breeding in the Provinces. After the United Provinces Government have made the position clear, the Council can decide the question on its merits. This was agreed to.

Khan Bahadur Afzal Husain's suggestion that the question of fodder for improving the cattle should also form part of the scheme was also accepted.

ITEM No. 34 (*e*).

Application from the Pattagar of Palayakottai for a grant of Rs. 99,868 (non-recurring Rs. 1,540 and recurring Rs. 98,328) spread over a period of ten years for a scheme for the improvement of the Kangayam breed of cattle. (Appendix LXXXVI.)

At the Animal Breeding Committee Mr. Hurley explained the details of the scheme and said that there was a possibility of improving the milking capacity of the Kangayam cows, as the results at Hosur had indicated that their yields could be raised from an average of 1,500 lbs. to 2,500 lbs. of milk in a lactation. If similar results could be obtained in the Kangayam breed in general without impairing the draught quality, a valuable supply of milk would be made available over a large area of southern India. For this reason the Pattagar, who was taking risks with a good number of his pedigree animals, requires encouragement. After discussion the Committee recommended the scheme for acceptance with the following modifications :—

(a) The experimental herd should be increased from 30 to 50 heifers ;

(b) Pay of the Officer-in-charge should be that of a Class II Officer in Madras, *i.e.*, Rs. 190—25|2—290—30|2—560.

(c) One peon should be reduced.

(d) Contingencies from second year should be reduced to Rs. 300 per year.

It was pointed out that the increase in the number of gowalas mentioned at page 6 of the report was due to the increase in the number of calves that will have to be looked after ; these gowalas are cattle attendants and not merely for milking cows.

The total cost of the revised scheme will be **Rs. 58,432 as follows :—**

	Recurring. Rs.	Non-recurring Rs.
1. Pay of officer on class II Madras Scale Rs. 190—25/2—290 30/2—560. (The officer selected for the appointment should have the I. D. D. and should work under the supervision of the Livestock Development Officer).	28,800	1,540
2. Pay of milk Recorder and Store Keeper (Rs. 30—55) ..	4,320	
3. Pay of one peon on Rs. 12 (4) ; 13 (4) ; 14 (5)	1,586	
4. Pay of Gowalas	13,536	
5. Travelling Allowance @ Rs. 500 per annum	5,000	
6. Office Contingencies for the Expert @ Rs. 1,000 for the 1st year and Rs. 300 per annum for the remaining 9 years.	3,700	
Total ..	56,892	1,540
GRAND TOTAL ..	58,432	

At the Advisory Board Sir Datar Singh said that in the Committee they had recommended that the number of animals in the experimental herd should be raised from 30 to 50. In this connection he suggested that it should be clearly stated that the number of gowalas or cattle attendants mentioned at page 6 of the scheme would remain unchanged. The Board accepted this suggestion.

Mr. Allan asked how the milk produced by the cattle would be disposed of. Mr. Hurley replied that the milk will be utilised for rearing the young stock. The Pattagar will have to find about 40,000 rupees spread over 10 years. At present the animals there are reared under semi-ranch conditions. He has got to feed this stock much better than he has been doing hitherto. Two annas per animal per day would be required and at the end of 10 years the Pattagar will have spent about 40 to 45 thousand rupees which is practically 50 per cent of the total cost.

Mr. Nizamuddin Hyder suggested that the Officer-in-charge of the scheme should be a geneticist and not only an I. D. D.

Mr. Ware replied that this point was discussed in the Committee and it was felt that the Officer-in-charge of the scheme should have a good deal of practical experience because he will have to work out the scheme from its commencement. The scheme is to be located in a village and a great deal of supervision will not be possible. Further he pointed out that the I. D. D. course includes some genetical training also.

The recommendations of the Committee were accepted.

ITEM No. 34 (*f*).

Application from the Government of the Punjab for a grant of Rs. 13,422 spread over 3 years for a scheme for starting a Herd Book and Pedigree Registration in respect of the Hariana Breed of cattle. (Appendix LXXXVII.)

The Committee considered that this proposal would fit in with the Council's scheme for the initiation of Herd Books detailed under item

35 (b). On the assurance of Captain Walker that three Veterinary Assistants would be sufficient for supervising the work and that milk-recording as envisaged in the Council's Herd Book scheme would be carried out, and that Rs. 2,000 would suffice for prizes, the Committee recommended the scheme for acceptance. The recommendation of the Committee were accepted by the Board.

ITEM No. 35 (*a*).

Principle to be observed in considering schemes of Poultry development—views of the Officer-in-Charge, Poultry Research Section, Izatnagar. (Appendix LXXXVIII.)

Noted for information.

ITEM No. 35 (*b*).

Steps necessary for the initiation and maintenance of Central Herd Books. (Appendix LXXXIX.)

At the Animal Breeding Committee the Council's note describing how it is proposed to initiate Central Herd Books for the Hariana, Sindhi and Sahiwal breeds was considered in detail and with one or two slight modifications accepted.

As regards the marking of animals, it was decided that each animal admitted into the Central Herd Book should be marked with the Herd Book number.

The point was emphasised that conformation must be the primary consideration when admitting an animal for the first time into a Herd Book. It was pointed out that this might result in some animals giving a good milk yield not being registered in the Herd Book on account of some minor discrepancy especially as regards colour. It was accordingly agreed that in regard to such an item as colour, modifications may be inserted after consideration by the appropriate body, in the definition of the characteristics of the breed.

After considerable discussion on the question of the minimum lactation which should be accepted in the case of animals applying for registration for the first time it was recommended that the amounts proposed in the note should be raised by 500 lbs. in each case.

In regard to registration fees it was pointed out that breed societies would probably charge fees and it was recommended that no fees should be charged for registration by the Animal Husbandry Bureau.

In regard to the staff which, it was suggested, should be employed for pedigree registration amongst village stock, it was decided that paragraph 2 at page 9 of the note, *i.e.*, the portion beginning " It will also be necessary " and ending " Rs. 13,000 " should be deleted.

It was decided that the rules and regulations to be observed for the maintenance of these Central Herd Books should be circulated to provinces and States for their comments and modification if necessary. A further report would be submitted to the Board.

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At the Advisory Board Mr. Ware said that we have already defined the breed characteristics of 8 milch breeds of all-India importance and it was the idea originally to open Central Herd Books for all these breeds. A scheme was accordingly put up to the Governing Body about 18 months ago for increase of staff in the Animal Husbandry Bureau but was rejected. Now it was proposed to take up only 3 breeds to begin with.

The recommendations of the Committee were accepted by the Board.

ITEM No. 36 (*a*).

Scheme relating to Veterinary Investigation Officers in the Provinces and in Hyderabad—Progress reports for 1938-39.

The various progress reports received from provinces and Hyderabad were scrutinized individually by the Animal Pests and Diseases Committee and it was considered that the work carried out during the year under review had produced further valuable results. The tests for tuberculosis in buffaloes carried out in the Bombay Presidency had shown the remarkable efficacy of the biological product 'tuberculin', prepared at the Imperial Veterinary Research Institute, Mukteswar.

The number of isolated cases of Johne's disease detected during recent years and the confirmation of the many outbreaks of Rinderpest in sheep and goats indicated that these infections were much more widely prevalent than was hitherto realised.

In regard to the tests carried out in the Punjab with varying doses of Rinderpest goat virus, mentioned on page 5, paragraph 17 of the report, it was desired that the exact number of animals subjected to the tests in each group should be mentioned.

The Committee noted that several of the provinces are now manufacturing Goat Rinderpest vaccine at their headquarter laboratories and in this connection they considered it very necessary, that the virus should be periodically tested at Mukteswar with a view to eliminating the possibility of its being supplied for field work in an inert state.

In regard to the condition affecting sheep and goats and known locally in Sind as Pitto and in the Punjab as Gillar, which has been under investigation for many years past, it was agreed that a concentrated effort should be made in collaboration with the Mukteswar Institute to determine its etiology.

On page 1 of the Bengal report, the reference made to the bovine abortion tests included the name of the owner of the herd which, the Committee considered, should not be mentioned in these reports in future.

Regarding the question of disposal of the positive cases of tuberculosis and Johne's Disease, the Committee were of the opinion that in view of the widespread incidence of these infections it is time that the attention of the public is drawn to the danger to other animals and, in the case of Tuberculosis, to human beings also, as segregation alone is not a satisfactory way of disposing of these cases.

The Committee observed that no officer appointed by this Council has been working in Bihar for the last twelve months. In some cases it was noticed that the amount of touring done by these officers was rather low.

Finally the Committee suggested that a summary of the work done during the year should be placed at the commencement of each report as it facilitated discussion.

With regard to the observation of the Committee that no officer appointed by the Council has been woking in Bihar for the last twelve months, the Chairman said that suitable action was being taken. It will also be enquired why the touring done was low.

The suggestions made by the Committee were accepted and the reports were adopted.

ITEM No. 36 (*b*).

Scheme relating to the investigation of Johne's disease in cattle in Mysore—Progress report for 1938-39.

The Animal Pests and Diseases Committee desired that a consolidated statement relating to the work carried out so far should be submitted to the Council at an early date in accordance with the instructions of the previous meeting of the Advisory Board. Further it was considered that the study of the chemistry of the bacillus of Johne's disease was a problem for fundamental research and should be investigated at the Central Institute. It was also observed that the results of treatment with *chaulmoogra oil* had not so far yielded any definite results.

The Board approved the report subject to the above remarks.

ITEM No. 36 (*c*).

Scheme for the control of ticks in the Bombay Presidency—Progress report for 1938-39.

The results of the first year's working of this scheme had demonstrated that spraying machines are not readily portable and that the cost of these machines is high. This method is therefore not likely to prove economical and it was considered by the Animal Pests and Diseases Committee that the use of tanks for these dipping operations will be more satisfactory under the conditions obtaining in this country.

The Board approved the report subject to the above remarks.

ITEM No. 36 (*d*).

Scheme for research on Warble flies at the Imperial Veterinary Research Institute, Mukteswar—Progress report for 1938-39.

At the Animal Pests and Diseases Committee, Mr. Sen drew attention to the important features of the report and said that a number of interesting observations had been made during the period under review. The regional distribution of *Hyooderme lineatum* was now fairly well-known and a method had been evolved by which these flies could be reared under artificial conditions. The life-history of this fly, excluding information regarding the period of incubation of the eggs ; had been worked out. An extremely important point which does not conform to the findings in other countries was that eosophagoal forms did not appear to be migrating to

the back of host and that the route taken by these larvae to their final destination must be a different one. Further, in the work carried out at Mukteswar the larval forms of *Hypoderma bovis* had never been encountered in the Oesophages and only one record of this species had been obtained. The Committee considered that valuable work had been done in regard to the cattle pests, but much remained to be done in connection with *Hypoderma crossi*, the goat Warble fly.

The Board approved the report subject to the above remarks.

ITEM No. 36 (*e*).

Scheme for the appointment of a Systematic Protozoologist at the Imperial Veterinary Research Institute, Mukteswar—Progress report for 1938-39.

As Theileriasis was prevalent in many parts of India and no effective remedy had been evolved so far, the Animal Pests and Diseases Committee recommended that work in this connection should be carried out more intensively.

The Board approved the report subject to the above remarks.

ITEM No. 36 (*f*).

United Provinces Helminthological Research Scheme—Progress report for 1938-39.

The Animal Pests and Diseases Committee considered that the report was a record of interesting work and furnished a formidable list of parasites. It was, however, observed that the work carried out so far had touched only the United Provinces and Orissa. The Committee, therefore, expressed the hope that other provinces allotted to this station would collaborate in this survey and provide the necessary material for investigation. Further, it was decided that, in addition to the information on incidence of infection in different animals, an indication should also be given regarding the relative intensity of infection of the parasites encountered.

The Board approved the report subject to the above remarks.

ITEM No. 37 (*a*).

Technical programme of the scheme relating to Veterinary Investigation Officers in the Provinces and in Hyderabad. (Appendix XC.)

The Animal Pests and Diseases Committee observed that some of these programmes needed elaboration on the lines of the Madras programme and suggested that the programme for 1940-41, as also the future programmes, should be submitted by the 1st of January so as to enable them to be scrutinized by the Animal Husbandry Commissioner and the Director, Imperial Veterinary Research Institute. Thereafter they would be returned with their comments and suggestions to the Provincial Directors who would submit them to the Advisory Board for approval.

The Board approved the programme subpect to the above remarks.

ITEM No. 37 (*b*).

Technical programme of the scheme relating to the investigation of poultry diseases in Madras, Bombay, the United Provinces, Bihar and the North-West Frontier Province. (Appendix XCI.)

The same main lines of work as had already been approved for Disease Investigation Officers was also recommended by the Animal Pests and Diseases Committee for these officers, *viz.* :—

(a) Thorough post-mortem examinations and systematic clinical investigations in the affected area, where preliminary microscopic examinations only, such as may be necessary and possible for field workers to carry out, should be made.

(b) The submission of carefully preserved and suitable material to the Imperial Veterinary Research Institute, Mukteswar, and

(c) Precise records of all clinical data obtained as to the effects of the disease and all possible sources of infection.

It was also recommended that these officers should undergo a training of six months at the Imperial Veterinary Research Institute, to consist of training in disease investigation methods at Mukteswar and in poultry management at Izatnagar, but in case an officer had already undergone the Post Graduate Course at Mukteswar, his period of training should be correspondingly reduced.

This was approved by the Board.

ITEM No. 37 (*c*).

Technical programme of the scheme for the survey of the incidence of helminth infection in India. (Appendix XCII.)

Approved.

ITEM No. 37 (*d*).

Technical programme of the scheme for investigation into the contagious abortion of cattle, sheep and goats. (Appendix XCIII.)

Approved.

ITEM No. 37 (*e*).

Technical programme of the Mysore Poultry Disease Investigation scheme. (Appendix XCIV.)

The Animal Pests and Diseases Committee were of the opinion that it was impossible to undertake the systematic investigation of all the diseases mentioned in the programme and therefore wished that the Officer-in-charge should specify the problems which he proposed to take up during the first year of investigation.

The Board endorsed the views expressed by the Committee.

ITEM No. 37 (*f*).

Technical programme of the scheme for Helminthological Research at the Nagpur University by Dr. M. A. Moghe. (Appendix XCV.)

Approved.

ITEM No. 38.

Application from the Government of the Punjab for a grant of Rs. 2,825 for one year for the extension of the Parasitological Research Scheme. (Appendix XCVI.)

The Animal Pests and Diseases Committee observed that valuable results had already been obtained and it had been shown that combination of Copper Sulphate and Kemala yielded the best results in sheep and that mineral deficiencies in feed increased the incidence of helminthic infection. It was, therefore, considered that the time had now arrived for making use of the results so far obtained and that it was not necessary to repeat all the previous work as proposed in the scheme. A new scheme may, if considered necessary, be put up for application of the results obtained previously on village flocks.

The Board endorsed the above observations.

ITEM No. 39 (*a*).

Application from the Government of the Punjab for a grant of Rs. 8,850 spread over a period of 5 years for poultry disease investigation work. (Appendix XCVII.)

It was observed by the Animal Pests and Diseases Committee that this scheme agreed in detail with the co-ordinated plan for investigation already approved by the Council. It was accordingly recommended for acceptance, with the modification that the officer appointed should work in collaboration with the Pothologist at Mukteswar, until the special officer to be appointed for the investigation of poultry diseases at Izatnagar commences his duties.

The Board accepted the above recommendation.

ITEM No. 39 (*b*).

Application from the Director, Imperial Veterinary Research Institute, for a grant of Rs. 47,000 spread over a period of five years for a scheme of research (i) *into the damage caused by ticks to hides and skins and* (ii) *for the extension of the warble fly scheme for a period of five years.* (Appendix XCVIII.)

This scheme is designed to further the knowledge already gained in the study of warble flies in India. During the course of that investigation the incidence of warble flies and the damage done by these pests in the case of goats has been brought to light, but while it is expected that the objects of the scheme now running will be fulfilled as far as the ox warble is concerned, it will not be possible to complete the study of the condition in goats. As the results of the work already done, the magnitude of the damage and the incidence of the pest clearly indicate that this problem should be pursued further, the Animal Pests and Diseases Committee recommended that this should be done.

Further, during the course of the present warble fly investigation scheme, evidence has accumulated to show that damage to hides and skins by ticks is of similar importance to that done by warble flies. A scheme to study the effect of dipping on the periodicity of ticks is already in hand in Bombay and the proposed scheme is additional and complementary to that. The bionomics of the most prevalent ticks will be investigated, and

the question of their control by biological methods will be attacked. It is also proposed to try and evolve suitable dipping agents prepared from indigenous materials. The Committee examined the necessity for the staff suggested and they were agreed that the demands were justified.

The Board endorsed the above recommendations.

ITEM No. 39 (*c*).

Scheme for the preparation of a critical monograph on 'Rinderpest in India'. (Appendix XCIX & C.)

The scheme was discussed by the Animal Pests and Diseases Committee in the light of the recommendations made by the Standing Committee on Nutrition and the Committee agreed that an honorarium should be recommended on the same basis. The author's remuneration would be Rs. 12 per 1,000 words with a maximum of Rs. 1,000.

The Board accepted the recommendation of the Committee.

ITEM No. 39 (*d*).

Scheme for investigation of poultry diseases in the Central Provinces and Berar. (AppendixCI.)

This scheme is similar to that in 39 (*a*) and needs no further explanation. The Animal Pests and Diseases Committee recommended the scheme for the approval of the Board.

The Board accepted the above recommendation.

ITEM No. 39-I.

Effect of legislation on the control of contagious cattle diseases with special reference to the working of the Central Provinces and Berar Cattle Diseases Act, 1934. (Appendix CII.)

The Animal Pests and Diseases Committee agreed that for the general control of disease it was necessary to have legislation by all provincial and State Governments. The Committee recommended that this subsubject, together with a draft model bill, should be placed on the agenda of the next Animal Husbandry Wing meeting. Thereafter the bill can be circulated to provinces and states for adoption with such modifications as might be considered necessary.

The Board endorsed the above recommendation.

ITEM No. 40 (*a*).

Annual Report of the Scheme for the manufacture of cattle-feed from molasses—1938-39.

The Animal Nutirition Committee noted with interest the results incorporated in the report. It was, however, felt that as there was a great deal of variability in the results of feeding trials it was necessary to withhold further work on such experiments at out-stations until the interim report of the preliminary trials on feeding of bago-molasses to bullocks, which was to be carried out at Izatnagar, was available. It was further recommended that the work at Izatnagar should include group of village cattle so that the results obtained would be applicable to village conditions

and not to form animals alone. It was also suggested that information relating to the cost of bago-molasses at the source of supply should be obtained.

The Board approved the report subject to the above remarks.

ITEM No. 40 (*b*).

Annual Report of the Physiological Chemist, Animal Nutrition Section, Bengal, for the year 1938-39.

The Officer-in-charge of the scheme explained to the Animal Nutrition Committee the details of the various investigations carried out during the period under review and drew attention to some printing errors in regard to the formulæ on page 6. He particularly drew attention to the results obtained with the feeding of Napier silage in which Calcium was deficient and observed that it would be interesting to obtain information on this point from other places. The question of the study of the constituants of rice by-products with particular reference to the phosphorus component, has been dealt with in connection with the application for supplementary grant. The Committee considered that the report recorded a valuable year's work but desired that the table on page 19 (Appendix IV) should be given in more detail expressing the co-efficient of digestibility and the period for which the experiment was conducted.

The Board approved the report subject to the above remarks.

ITEM No. 40 (*c*).

Progress report of the Cattle Feeding Research Scheme of the United Provinces for the year ending 31st March 1939.

The Animal Nutrition Committee noted with interest the effect of feeding berseem to Hissar and Murrah heifers. It was, however, felt that in future schemes of this nature, where no digestibility trials were contemplated a larger number of animals should be included so as to enable the results to bear statistical scrutiny. Further it was necessary that the regression in lactation yield under different feeds should be correlated with the lactation curve and not expressed in the form given in the report. It was also extremely important that healthy animals should be selected for the experiments and that they should be periodically tested against specific diseases. In table V on page 8, 'total yield in the previous lactation' and 'average milk yield per day' should also be shown. Further detailed information in regard to average yield of crop per acre should be given in the table under Appendix XIX.

The Board approved the report subject to the above remarks.

ITEM No. 40 (*d*).

Report on the scheme for the analysis of indigenous fodders in Bihar.

The Animal Nutrition Committee considered this report to be interesting and useful and noted the superiority of berseem and other leguminous plants as compared with the more commonly available straws.

They were of the opinion that the different varieties of *aus* and *aman* rice straws should be differentiated and that the analyses of straws

from different provinces should also be carried out if possible. Certain errors in the tables were noted for correction.

The Board approved the report subject to the above remarks.

ITEM No. 40 (*e*).

Detailed report of work done under the scheme for the extension of Animal Nutrition work at Coimbatore for the year 1938-39.

The report was examined, but the Animal Nutrition Committee noted that there was no one present who was in a position to explain the details. It was agreed that in the case of the mineral metabolism studies the amounts of mineral required and administered should be given in terms of a fixed live-weight in order that the results might be comparable with those obtained elsewhere.

With regard to the studies on mineral deficiency, the Committee felt that in this, as in other cases of similar nature, the necessity for close collaboration between the staff carrying out the scheme from a nutritional standpoint and the staffs in the province already interested in the physiological, pathological and field control work was to be emphasised, if the full value of these schemes was to be realised.

It was suggested that the work should be extended in collaboration with the Disease Investigation Officers of the Madras Presidency and Hyderabad State and through them with the Central Institute which was already engaged on work on this subject. The Committee suggested that if possible the estimation of selenium might also be under-taken in addition to fluerine.

It was also recommended that, while in all cases the figures for analyses of grasses on a dry basis were essential, similar figures on a fresh basis should be given where possible in addition, as this would be of great assistance to the application of the work in actual practice. It was felt that digestibility feeding trials should be extended to 10 days until it was clearly established that the shorter periods (4 days) used in this case yielded reliable figures.

The Board approved the report subject to the above remarks and endorsed the suggestions made by the Committee.

ITEM No. 40-I.

Application from the Government of Bengal for a supplementary grant of Rs. 5,840 in connection with the scheme for animal nutrition work in Bengal. (Appendix CIII.)

At the Animal Nutrition Committee, the Officer-in-charge of the scheme explained the details and observed that a small supplementary grant was needed in order to extend the study of the constituents of rice by-products with particular reference to the phosphorus content and the manner in which the phosphorus components could be converted from an unassimilable and possibly harmful form into an assimilable form. It was reported that night blindness and gastro-intestinal troubles often follow the indiscriminate feeding of rice mill by-products and the committee felt that, although it did not appear to be practicable in this

instance, it was desirable in investigations of this type that concurrent work on the physiological and pathological aspects of the problem should be undertaken. The present work requires the handling of a large number of samples, and for this extra staff will be necessary. The Committee recommends the expenditure proposed in connection with the appointment of two Junior Assistants and Travelling Allowance which would bring the contribution from the Council to Rs. 4,340 part of which would be met from savings in the scheme, the Provincial Government meeting their share of the expenditure as detailed in the scheme. The Committee were of the opinion that the byre assistant, if necessary, should be provided by the province. The Committee was also of the opinion that this supplementary investigation should be carried out concurrently with the main scheme which is to run up to 1st January 1942, and an early provision of funds is recommended.

The Board accepted the above recommendations.

Item No. 41 (*a*).

Application from the Government of the Punjab for a grant of Rs. 5,800 for a period of three years for a scheme of study of the nutritional requirements of milch cattle. (Appendix CIV.)

At the Animal Nutrition Committee, Dr. Lander explained the details of the scheme and observed that the present proposal originally formed part of a larger scheme which had been sanctioned by the Council and was now in operation at Lyallpur. On account of the curtailment of the programme, however, he had been precluded from carrying out the work on dairy cattle. Due to the importance of this work and for the reason that data on dry heifers would not be applicable to milch cows, he was again approaching the Council for this modest supplementary grant. During the course of discussion the view was expressed that sufficient attention was not being given to numerous dairy problems in this country as a whole and that efforts so far made were concentrated only on minor items and piecemeal investigation. It was, therefore, necessary that all such problems should be collated with a view to preparing suitable comprehensive schemes and that fundamental problems should be dealt with by the Central Dairy Institute, the provincial stations devoting their attention to other practical problems, and work in close collaboration with the Central Institute. As the scheme under consideration was of importance to the north of India, and as facilities were already available it was recommended that this preliminary work should be carried out at Lyallpur and the results obtained therefrom would be helpful later to the Central Dairy Institute when more fundamental problems are taken up. It was further recommended that the technical programme should be elaborated in consultation with the Director of Dairy Research. It was also agreed that the services of a bull should be obtained from the provincial Government, and the income from sale of milk, etc. should be credited to the Council. The amount under "Maintenance" was reduced to Rs. 1,150 bringing the cost of the scheme to Rs. 5,150 (Rs. 1,450 recurring for three years and Rs. 800 non-recurring).

The Board accepted the above recommendations.

ITEM No. 41 (*b*).

Application from the Director, Imperial Veterinary Research Institute, Mukteswar, for a grant of Rs. 53,000 for a period of 5 years for the inclusion of milch cows in the molasses nutrition scheme. (Appendix CV.)

At the Animal Nutrition Committee, Dr. Minett explained the details of the scheme and its connection with the present scheme, relating to feeding trials with Bago-molasses on bullocks, which had already been approved. Prior to undertaking this supplementary scheme, however, he proposed to carry out as early as possible one of the experiments in the scheme already sanctioned in a slightly modified form, which would provide precise information regarding the deleterious effects and nutritive value of molasses. The data thus obtained would indicate whether any further modifications were necessary in the present scheme. The Committee agreed with the views expressed by Dr. Minett and recommended the postponement of this scheme until such time as the results of the preliminary trials on bullocks are available. They also recommended that, in revising the scheme, the experience gained and the results, obtained hitherto, particularly at the Imperial Dairy Institute, Bangalore, and the Imperial Agricultural Research Institute, New Delhi, where work is still in progress, should also be examined.

The Board accepted the above recommendations.

ITEM No. 41 (*c*).

Scheme for writing up a monograph on 'Animal Nutrition in India'. (Appendix CVI.)

The scheme was examined in detail and the work involved was brought to the notice of the Animal Nutrition Committee. The opinion of the Committee was that an appropriate scale should be fixed for such work which would form a guiding principle which could be followed for similar cases arising in future. The practice followed in Great Britain was examined and it was felt that the monographs produced by the Council should be in no way inferior to those produced abroad, and therefore somewhat similar rates would be applicable. The nature of the assistance required was also closely examined and it was felt that if the monograph was to be produced in a reasonable time it would be necessary to provide the assistance requested. The officer selected to write the monograph would have to undertake this work in addition to his ordinary duties and it would be impossible for him to travel all over India to examine the records necessary for his work. The records would be examined, documented and brought to the notice of the author by the trained assistant.

It was finally decided that the scheme be recommended for approval by the Board and that the honorarium should be fixed at Rs. 12 per 1,000 words subject to a maximum of Rs. 1,000.

At the Advisory Board Khan Bahadur M. Afzal Husain enquired whether anybody was prepared to write up the monograph. It was stated in reply that Dr. Sen had taken in hand the writing of a monograph on animal nutrition and Mr. Haddow was writing the monograph on rinderpest.

The Board accepted the recommendation of the Committee.

ITEM No. 42.

Application from the Registrar, Calcutta University, for a grant of Rs. 15,500 spread over a period of three years, for the extension of the scheme for investigation into the life history, bionomics and development of fresh water fishes in Bengal. (Appendix CVII.)

At the Animal Breeding Committee Dr. Mookerjee explained the details of the work carried out so far and the necessity for the extension of the scheme. The Committee realised the importance of the work and recommended its extension for three years on somewhat the same scale as in the original scheme. The lines of work should be as indicated by the Fish Committee in May 1939, and the Council's contribution should be as under, the rest being provided by the University :—

		Rs.
1. Two Research Assistants— one @ Rs. 90—5—100 one @ Rs. 80—5—90	for 3 years ..	6,480
2. One Laboratory Assistant (Special attendant) on Rs. 22 per month for 3 years.		792
3. Wire netting for hatchery in the pond and its up-keep for 3 years.		1,250
4. Food of fishes to be purchased for experimental purposes.		250
5. Fish and fries to be purchased for experimental purposes.		600
6. Contingency		300
7. Floating Hatchery		250
8. Travelling allowance for visiting Fishery Tanks for studying the indigenous method adopted by local fishermen in breeding carps.		400
	Total ..	10,322

At the Advisory Board, Khan Bahadur Mian Afzal Hussain suggested that the scheme should first be sent to some fish experts for their advice.

Mr. Ware said that in May last a Fish Committee was held at which certain Fish Experts were present who examined the previous progress reports of this scheme. In recommending this extension now, the Committee was very careful to see that any work done under the extension should be on the same lines as recommended by that Fish Committee.

The Chairman thought, however, that the suggestion was sound and the advice of some fish experts should be obtained in writing and, if necessary, the scheme revised accordingly.

Subject to this, the extension was approved by the Board.

ITEM No. 43.

Progress Report of the Bengal Fresh water fishes scheme for 1938-39.

The report was adopted by the Animal Breeding Committee and the Advisory Board.

ITEM No. 43 (I).

Technical programme relating to the scheme for the carrying out of biological investigations in the Chilka Lake Fishery. (Appendix CVIII.)

The technical programme was approved by the Committee and the Advisory Board.

Mr. Carpenter raised the question of the shortage of fish oil. He said that it was very desirable that the Board should devise a scheme for further research work for the development of such industries as may supply the necessary amount of fish oil. He realised that at the present moment it would not be possible to start this work on a commercial scale. *First of all it should be ascertained what particular fish have the highest* vitamin content.

The Chairman promised to look into the point raised by Mr. Carpenter.

Lieut.-Col. Cotter said that work on the nutritive qualities of fish liver oil was being done at the All-India Institute of Hygiene, Calcutta, and also at the Nutritional Research Laboratory at Coonoor. In the Hygiene Institute a number of oils obtainable from 15 varieties of local fish had been examined. The oils examined were stated to contain more Vitamin A than that present in an ordinary brand of Norwegian cod liver oil. The liver oils of two varieties of fish, namely *Air* and *Bhool*, had Vitamin A content of nearly half of that in Halibut liver oil and 25 times that of ordinary Norwegian cod liver oil, while liver oils from *Dhain* and *Shole* were nearly equal to Halibut liver oil. It would thus appear that the industrial exploitation of Bengal fish liver oils might be a feasible proposition.

The fish examined were all caught in fresh water. Some were of estuarine habits living mostly in the sea but coming up to fresh water during the spawning season. The differences in Vitamin A content according to habitat, *i.e.*, the fresh water or sea water stage of development of fish and season, were being investigated.

As for the work in the nutrition research laboratory in Coonoor, in the beginning of this year, the Director of Fisheries, Madras, had sent samples of shark liver oil to the laboratories. On investigation it was found to be very rich in Vitamin A, its potency being 10 times as great as for cod liver oil. The Director of Fisheries was consulting the laboratories with regard to the possibility of using this oil on a wide scale, and the prospects in this connection seemed to be good.

Mr. Carpenter hoped that this important investigation would aid the development of the fish oil industry, which needed all possible encouragement. Dr. Burns said that two years ago the question of the utilisation of the red palm oil for the supply of Vitamin A was considered by

the Board. Recently he saw some specimens of red palm growing extraordinarily well in the Mysore State.

It was decided that the attention of the Provincial Governments be invited to this matter and that it would be for the Directors concerned to put up suitable scheme as quickly as possible.

ITEM Nos. 44 (*a*) & 44 (*b*).

Progress Report by the Agricultural Marketing Adviser to the Government of India ; and Programme of future marketing work.

Mr. Livingstone reviewed the progress of the work done up to date and said that several reports were well advanced. He had put forward proposals for increasing the central staff in such a way as to speed up the output of the reports. So far as grading and standardising were concerned the Marketing staff had packed about Rs. 75 lakhs worth of graded produce, of which the Agmark *ghee* accounted for about three-fourths. Any further extension of work in this respect would mean expense in superintending the quality. Some tins of ghee had to be destroyed because they deteriorated on account of long storage. He therefore requested the Directors of Agriculture and Directors of Veterinary Services to take steps to authorise every member of their staff to examine and draw samples from the tins marked with Agmark. He said that strict control should be exercised in this matter in order to keep up the reputation of Agmark.

So far as the headquarters work on grade standards was concerned, the Council was financing experimental grading stations. But instead of Rs. 40,000, a provision of Rs. 20,000 had only been made and therefore he would have to stop all experimental grading work from 31st December.

In regard to the future programme, it was rather unfortunate that there should have been this political impasse, because in several of the provinces they had marketing legislation pending. The Bombay Government rushed their Markets Act through before they resigned, but marketing legislation was pending in the United Provinces and Bihar. Nevertheless it would be seen from the statement circulated that all the provinces were taking steps to develop their marketing work next year. The Provinces had been developing their marketing organisation step by step and in Bengal and Bihar it was proposed to start separate Marketing Departments. The Bombay Government had also appointed a Chief Marketing Officer and a staff of District Marketing Officers and the total expenditure in that province would be great. The total amount spent by the provinces would amount to Rs. 1,91,000, whereas the amount allotted by the Council would amount to 1,98,000. Mr. Livingstone said that it was intended that there should be no new marketing surveys but the marketing staff should now devote their attention to development work and finish the marketing surveys now in hand.

Raja Jagannath Baksh Singh said that he had read with considerable interest the activities of the Marketing Department from the papers that were circulated and found that the Department had done very useful work. He drew attention to the fact that sufficient attention had not been paid to the prices of the import trade which was a very im-

portant factor to count and had a great bearing over the prices of agricultural commodities in this country. This was a line in which the Provincial Governments could give little help. This was an all-India question and the prices of import trade could only be controlled from the centre. There was no other body competent to advise in this respect than the Advisory Board of the Imperial Council of Agricultural Research. He was of the opinion that the recommendations of the Council would in no way commit the Government of India, so they would only be recommendatory. He then referred to the formation of a central committee for the control of agricultural marketing as a result of the recommendation of the Ministers' Conference and suggested that in the same manner a sub-committee to look into the question of prices of import trade and to advise the central committee from time to time should be appointed. This in his opinion would help the development of agricultural operations. The Raja Sahib further said that the activities of the Marketing Department were more to the benefit of the consumer then that of the producer. He did not however deprecate the idea of giving attention to the needs of the consumer, but he thought that the interests of the producer should prevail in the consideration of prices.

Mr. Livingstone said that the Marketing Departments were always in close touch with the movement of commodities and their prices and cited instances of the work that was being done in connection with coconut, copra and coconut oil, rice and wheat. He said that the wheat duty was reimposed as a result of the figures supplied by the Marketing Department. He assured the Board that these matters were constantly looked into and appropriate action taken wherever necessary.

The Chairman said that it was not quite accurate to say that this Council could not make recommendations in connection with these matters. He said that the Rice Committee did make a definite recommendation only a few days ago which was endorsed by the Board. The constitutional position was that the Council could not institute an enquiry but that did not prevent them from making recommendations that an enquiry be instituted. So far as the constitution of a special sub-committee for this purpose was concerned, the Chairman said that it would be noticed in connection with items 2 and 6 of the Agenda that a special sub-committee which had been appointed had recommended the constitution of an Economic Development Committee as an adjunct to the Advisory Board and matters like control of prices of import trade would come up from the special commodity committees to the Economic Development Committee and would be considered by it in full detail. The recommendations of this committee would come up before the Council.

The Board approved the progress report of the Agricultural Marketing Adviser.

ITEM No. 44 (c).

Consideration of allotment of funds to Provinces for marketing work from the 1st April 1940. (Appendix CIX.)

The Chairman said that this was connected with the allotment of funds to provinces for marketing work from 1st April 1940. He suggested that the Board might proceed to consider the allotment of funds on

the assumption that the Council would get the grant from the Central Government but no one could say now whether or not it would be received.

Mr. Livingstone said that he had suggested a slight readjustment of the two lakhs and read out the figures of total expenditure budgeted for 1939-40 in the various provinces.

	Rs.
Madras	25,528
Bengal	36,174
Bombay	4,050*
Sind	580
United Provinces	62,744
Punjab	12,984†
Central Provinces	18,582
Bihar	17,436
Orissa	3,268
North-West Frontier Province	576
Assam	9,510

He drew attention particularly to the figures of Sind and the North-West Frontier Province ; these two provinces did not follow the example of others in putting a Senior Marketing Officer in charge. It was proposed to fix the grant for Sind at Rs. 15,000.

He added that Orissa, which was a new province should be given Rs. 15,000, North-West Frontier Province, owing to certain difficulties which existed there, might get Rs. 15,000, and Assam Rs. 15,000. The rest of the provinces would get Rs. 20,000 as proposed. This allotment would amount to two lakhs. He pointed out that in making the grant, the Government of India specified the amounts which each province was to get so that they could not interfere with it so far as this Board was concerned. He, therefore, suggested that a recommendation be made assuming that the Government of India was going to make an allotment of two lakhs that it might make the allotment on the above basis.

As regards the reduction of Rs. 5,000 in the grant to Sind because Sind had not appointed a Marketing Officer to supervise the work of the present staff, Rao Sahib Thadani pointed out that the matter was under the consideration of the Sind Government and it was expected that a special officer would be appointed. He, therefore, urged that the grant for Sind should not be reduced.

The Chairman suggested that the allotments proposed by the Agricultural Marketing Adviser to the Government of India might be generally

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*On the other hand Bombay Government had established an entirely new Department consisting of a Chief Marketing Officer and 10 Marketing Inspectors to work under him.

†Here again this does not include all the staff engaged.

approved, and if there were any savings later on, the matter could be further considered. He added that the smaller grant proposed for Sind was not so much because Sind had not appointed an officer as because Sind was a comparatively smaller province and therefore the work there was not quite as much as it was in bigger provinces like Madras, Bombay, etc.

Mr. McDougall wanted to know when the funds for 1940-41 would be actually allotted, for if the funds were not placed at the disposal of provincial governments in time it would be difficult to pay the staff already in employment. In case there was any doubt it would be better to include this item in the provincial budgets which were due very shortly.

The Chairman said that he was afraid he could not say when the Government of India were likely to decide the matter but could say this much that there was a suggestion on the part of the Government of India to drop this item entirely, so that if the Directors had any doubt about it the best course would be to ask their Governments to make arrangements for the whole of the staff and not to count on receiving this grant at all.

Mr. Stewart said that so far as the Punjab was concerned, his Government had already indicated that in view of special financial conditions existing there it would not be possible for them to undertake any new expenditure on this work at present. Mr. McDougall said that he was afraid the same was the case so far as Central Provinces Government was concerned and it would be the same in other provinces too.

After some further discussion, the allotments as proposed by the Agricultural Marketing Adviser were agreed to.

ITEM NOS. 45 (*a*) TO 45 (*f*).

Proceedings of :—

(a) First Edible Oils Conference, February 1939.

(b) Fruit Products Conference, February 1939.

(c) Second Edible Oils Conference, July 1939.

(d) Vanaspati Conference, July 1939.

(e) Third Ghee Conference, April 1939.

(f) Marketing Officers' Conference, October 1939.

The proceedings were recorded by the Board.

ITEM NO. 46.

Application from the Government of the United Provinces for a grant of Rs. 45,000 spread over a period of five years for a scheme of research work on ghee to be undertaken at the Harcourt Butler Technological Institute, Cawnpore. (Appendix CX.)

The scheme was discussed at length by the Dairying Committee which was of the opinion that fundamental research of the kind proposed in items 1 to 4 on page 4 of the scheme would be best carried out in the Central Dairy Research Institute. In regard to item 5, however, *viz.*, ' Special investigations for the detection of adulteration of *ghee* with small

quantities of foreign substances ', it was recommended that a separate scheme may be submitted for the purpose of *obtaining a quick test for* adulterants in *ghee*.

The Board accepted the recommendation of the Committee.

ITEM No 47 (*a*).

Statement showing the action taken on previous recommendations of the Dairying Committee for information. (Appendix CXI.)

At the Dairying Committee the Chairman explained that the statement was prepared for the information of the Committee as to the action taken on its recommendations at the previous meetings.

In regard to (d) in the statement, it was agreed that when the Draft Rules for dairy legislation were received back from the Public Health Commissioner they should be placed either before the Dairying Committee or before an *ad hoc* Dairy Legislation Committee.

As regards the manufacture of skim milk powder, it was recommended that the Director of Dairy Research should be requested to formulate proposals for the manufacture of this product in this country and to submit, if he considers necessary, an application for funds for the consideration of the Council. Incidentally it was held that in regard to other items also connected with fundamental research on dairying it should be open to the Director of Dairy Research to put up proposals as and when considered necessary.

The Board endorsed the views expressed by the Committee.

ITEM No. 47 (*b*).

Collection of data regarding cattle and buffaloes in villages. (Appendix CXII.)

At the Dairying Committee the note and the interim report on a portion of the data collected were discussed in detail and the Committee considered that as the data were of doubtful accuracy, it was not worthwhile continuing their analysis. Such an enquiry was, however, of considerable economic importance and it was considered that more accurate figures relating to the cost of production of milk by *gowalas* could be collected from such bodies as cooperative milk collecting societies or central creameries where they have been established in connection with the supply of milk from rural areas to towns.

The observations of the Committee were endorsed by the Board.

ITEM No. 47 (*c*).

Consideration of the problems arising in connection with the supply of milk from villages to towns. (Appendix CXIII.)

In introducing this subject, the Chairman observed at the Dairying Committee that he was responsible for bringing it up for consideration as he was impressed with the urgency of this problem. It was generally agreed that supply of milk from villages to towns was essential in the interests both of the village producer and the town consumer, but there

were a large number of practical difficulties associated with this problem *on which there was no precise information available.* He thought that suitable advice based on the combined experience of the members would be of great value to Governments, local bodies, individuals and private concerns which intended to undertake such supplies. During the course of the discussion it was stated that the price of milk in villages within a radius of 5 to 7 miles of a town was in most cases the same as in the town *and therefore such milk cannot be brought to the town as it would sell at* dearer rates than the milk produced in the town.

The general concensus of opinion was that one method of tackling this problem would be the establishment of central co-operative dairies in suitable rural areas where milk sells much cheaper than in towns and along with this the establishment of central creameries should also be considered for dealing with surplus milk. Further details in this connection should be worked out with the assistance of the Livestock and Dairy Officers in the provinces. This subject also involves the prosecution of fundamental research. The problems relating to processing, transportation and distribution of milk and its by-products require investigation at the Central Dairy Institute. Further, it was stressed that the provisions of the Municipal Acts should be more rigidly enforced in order to check the adulteration of milk and its by-products in towns.

It was considered that in view of the diversity of conditions obtaining in different parts of the country and the complexity of the problem, it was not possible to deal in more detail with the subject in a committee meeting, and the Committee recommended therefore that the various questions enumerated in the note might be circulated to the members of the Committee with the request to supply written answers thereto and a summary thereof should be placed before the next meeting of the Commitee.

The Board accepted the recommendations of the Committee.

ITEM No. 47 (*d*).

The question of the salvage of dry cows in large cities and the economic problems arising therewith. (Appendix CXIV.)

At the Dairying Committee it was explained that the object of bringing up this subject again was to ascertain whether the resolution of the last Animal Husbandry Wing meeting, relating to the appointment of another expert committee, was acceptable to the Board and, if so, what the personnel and terms of reference of the committee should be. In the discussion which followed, certain observations were made and experiences narrated which further confirmed the conclusions already embodied in the note. Thus in one instance it was found that out of 322 cows purchased from the breeding tracts of the Punjab and stationed in a Dairy Farm at Calcutta as many as 206 had to be disposed of on account of failure to conceive, and 60 had died, although they were given green fodder. These cows on an average cost Rs. 200 per head on arrival at the farm, but when sold fetched only Rs. 40 per head. Again, in another instance it was found that out of a number of cows purchased by a Company from Simla at the end of the season 50 per cent aborted and 20 per cent died. The remaining 30 per cent calved, but their milk yield fell from 10 seers to 1½ seers, with the result that the Company, which

was floated for the purpose of exploiting salvage, lost heavily. The opinion was expressed that a vitamin deficiency in the fodder which is supplied to these animals, while they live under urban conditions, is the root cause of the difficulty which is experienced in turning these cows to economic use after salvage.

After exhaustive discussion, the Committee considered that the recommendations of the last Animal Husbandry Wing meeting should be accepted and an expert committee appointed for re-investigating the problem in the three big cities of India. The personnel of the Committee should consist of the Animal Husbandry Commissioner, a representative each of the Imperial Dairy Department and the Central Marketing staff, Sir Datar Singh to represent cattle breeders in the Punjab, and four or five suitable official and non-official members co-opted in each of the three cities.

The terms of reference should be as under :—

1. Is it advisable and feasible, in view of local conditions, to make arrangements for moving *gowalas* and their cattle outside city limits ?
2. If so, what is the best way of giving effect to this recommendation in each of the three cities and what steps should be taken to make milk of good quality available in cities ?
3. If moving *gowalas* out of cities is not feasible, what other action is recommended ?
4. To what extent will the interest of the cattle breeders in the breeding tracts be affected by reducing the trade in milch cattle to large cities ?

At the Advisory Board, in reply to a query from Mr. Allen, Mr. Ware said that the question of salvage of buffaloes was also included in this investigation. Further, in reply to Mr. Sitarama Reddy's suggestion that *a time-limit must be fixed for the submission of the Report of the sub-committee*, Mr. Ware said that the report of the sub-committee would not be available in less than 12 months' time.

It was decided that no time limit should be laid down for the preparation of the report but it was understood that it would be expedited as far as possible.

The Chairman enquired as to what the recommendation of the Board was in respect of the progress reports which had not been received. He suggested that it ought to be made clear to the various provinces and the officers responsible for the submission of these reports that they must be submitted in time. He recalled a resolution to this effect which had already been passed at the last meeting of the Advisory Board. Mr. Allan said that the delay in certain cases was due to the change in procedure. Originally the reports used to be printed by the Council but now the provincial governments were asked to submit printed reports. Dr. S. K. Mitra and Mr. McDougall also said that much delay occurred in getting the reports printed in the provincial press. Mr. McDugall suggested that, if possible, the Council should get the Progress Reports printed in the press of the Government of India as before.

The Chairman said that Mr. McDougall's suggestion was not feasible, particularly at the present time when the Government Press was frightfully busy with War work. If this work were done here, it would be found that the delays would be much worse than if they were printed at the provincial press. He added that another point to be considered was the size of the reports which sometimes were the cause of delay and suggested that efforts should be made to cut down the Progress Reports to a reasonable size. Dr. Burns said that a recommendation to the effect had already been made and in some cases it had been given effect to. In other cases the workers had not been able to comply and he advised those who felt that they must put up a 100 page report, to look into the report of the Rothemsted Experimental Station in which the entire material was put in a most compact form. The Chairman suggested that it would be very helpful if the Directors of Agriculture and Directors of Veterinary Services also kindly did some pruning of the reports submitted by the workers.

The Board agreed that the delay in submission of the reports should be brought to the notice of the Provincial Governments and they should be requested to expedite their submission as well as their printing where necessary. It was also agreed that the prompt submission of reports should constitute one of the conditions of future grants by the Council.

The Chairman informed the Board that a new publication—called *Indian Farming*—was shortly to come out as a monthly journal of the Imperial Council of Agricultural Research and he hoped that every body would help to make it a success and give it a good start.

Finally he thanked the members for their wholehearted co-operation and help in conducting the proceedings of the Board.

The meeting then adjourned *sine die*.

S. BASU,

Secretary.

The 5th December 1939.